**DECEMBER • 1948**

**Vol. 5 • No. 12**

LONDON GUARANTEE BUILDING
Michigan Avenue at Wacker Drive
THE HOME OF

finish

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# finish

CERAMIC FINISHES ON METAL

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# Deliver the Chemical Equivalent of DISTILLED WATER

## but at a very small fraction of the cost

*Give the Mill Room ASSURANCE that the "slip" is always RIGHT*

With Industrial's Water Ion-Exchange Demineralizers pure water is obtained through the use of ion-exchange resins. All dissolved mineral salts are removed without any stills, heat, or steam. No cooling water is required and there are no scale formations. The cost of ion-exchange demineralized water is only a few cents per 1000 gallons compared to the several dollars for distilled water.

For over twenty years INDUSTRIAL has specialized in the manufacture of filters for the clarification of nickel dip and neutralizer solutions. Since INDUSTRIAL filters are used for the removal of suspended solids from dirty water before demineralizing, the addition of the Ion Exchange Department enables us to offer the complete equipment for low-cost, total purification of water.

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FRIT from CENTURY

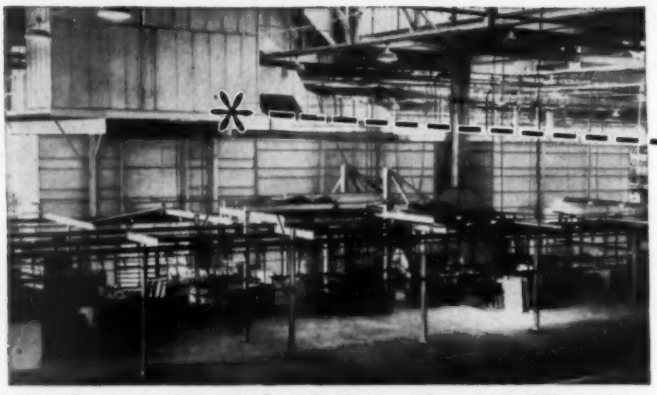
FRIT MASTERS

## *Time-Proved* by Laboratory, Plant and Production Checking

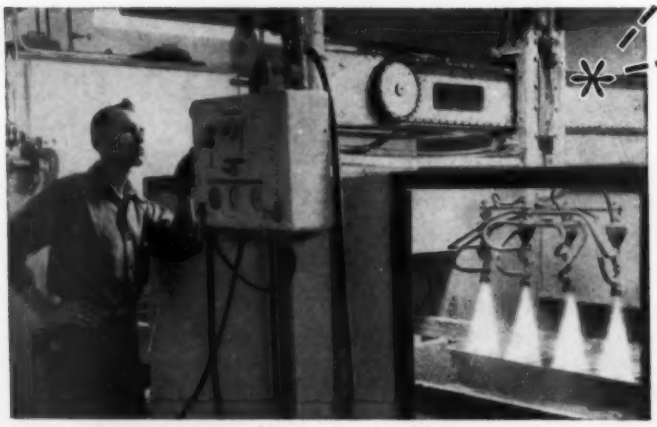
Uniformity of finish and ease of production — two big problems in porcelain enameling are solved by Century's time proving method. Every type of Century frit is laboratory tested, plant tested and proven in operation before being offered for sale. This assures you satisfactory results when using Century frit for any enameling purpose. Write today for a trial run to check Century *time-proved* frit in your plant.

CENTURY VITREOUS ENAMEL CO., 6641-61 S. Narragansett Ave. Chicago 38, Ill.

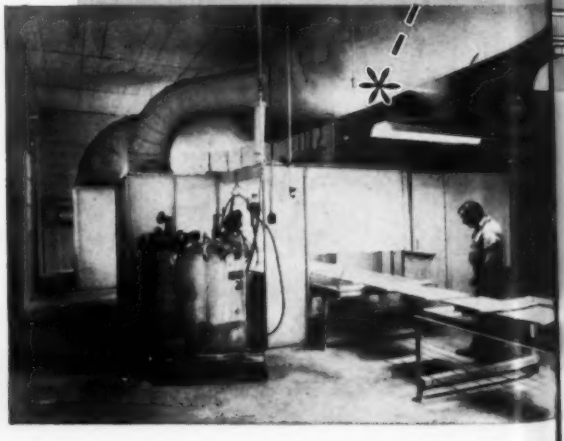
# ANOTHER DEVILBISS *Complete* PORCELAIN ENAMELING SYSTEM



Air replacement unit, mounted overhead to save floor space, delivers clean filtered air to the spray rooms which are pressurized to keep the finish perfectly clean.

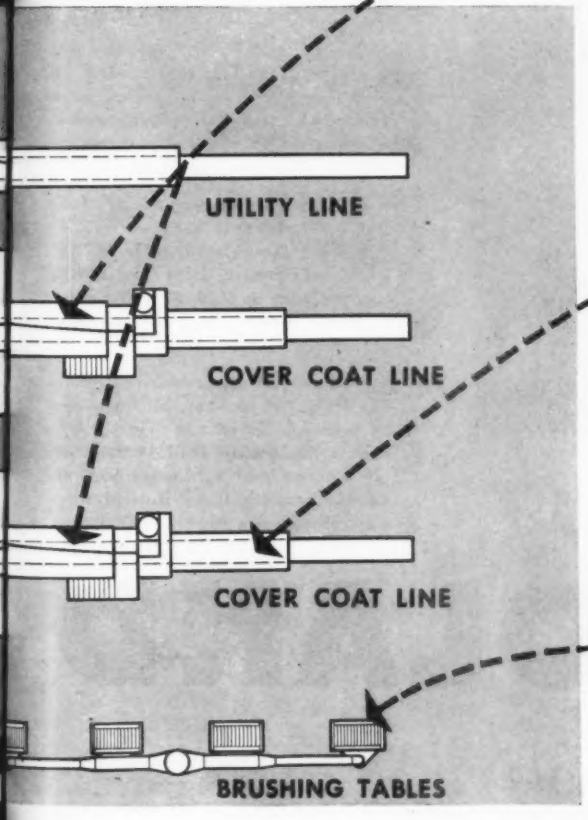


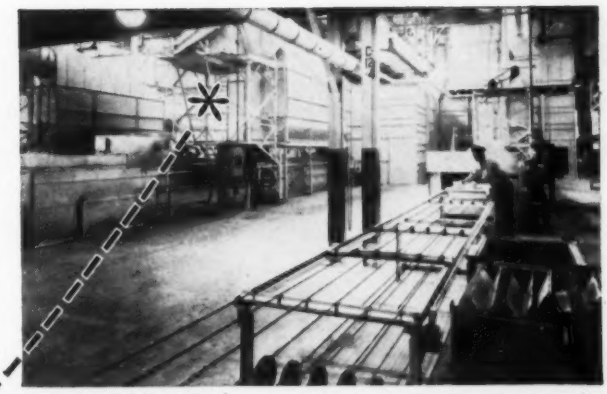
DeVilbiss automatic spray machines, each with multiple guns, apply an even, uniform coat at remarkable speed with great savings in both material and labor.



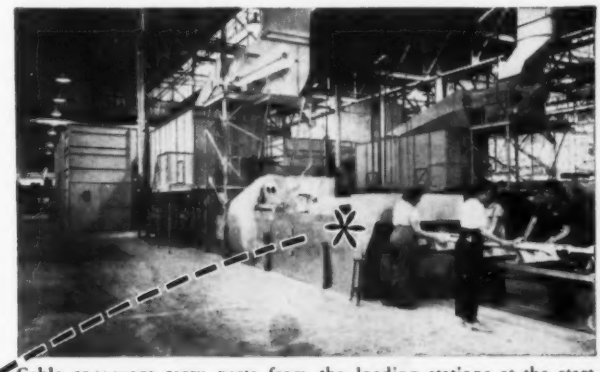
All spraying is done inside DeVilbiss pressurized rooms where dust and dirt cannot contaminate the finish. Inter-connecting exhaust ducts carry the over-sprayed material to an efficient water wash chamber where the solids are arrested.

This Consolidated Vultee plant is a pical example of DeVilbiss-Engineered and eVilbiss-Coordinated complete enameling de- rtments. The diagram and illustrations portray e space saving arrangement of efficient enamel- g equipment which is turning out quality stove mponents in vast quantities, at low cost, and ith a very high degree of uniformity.



Two elevated DeVilbiss water wash exhaust chambers shown at the upper left, draw from the spray booths and wash the air before discharging it to the outside. Approximately 99% of over-sprayed materials are recovered in these systems.



Cable conveyors carry parts from the loading stations at the start of the enameling lines through all spray operations including the dryers shown above.

Four DeVilbiss down draft brushing tables remove all annoying dust and loose material caused by the brushing operation. Health hazards are eliminated and working conditions are greatly improved.

*Have your enameling department analyzed by a DeVilbiss engineer. There is no obligation, and more than likely he can show you short cuts to finer quality, greater production and lower costs.*

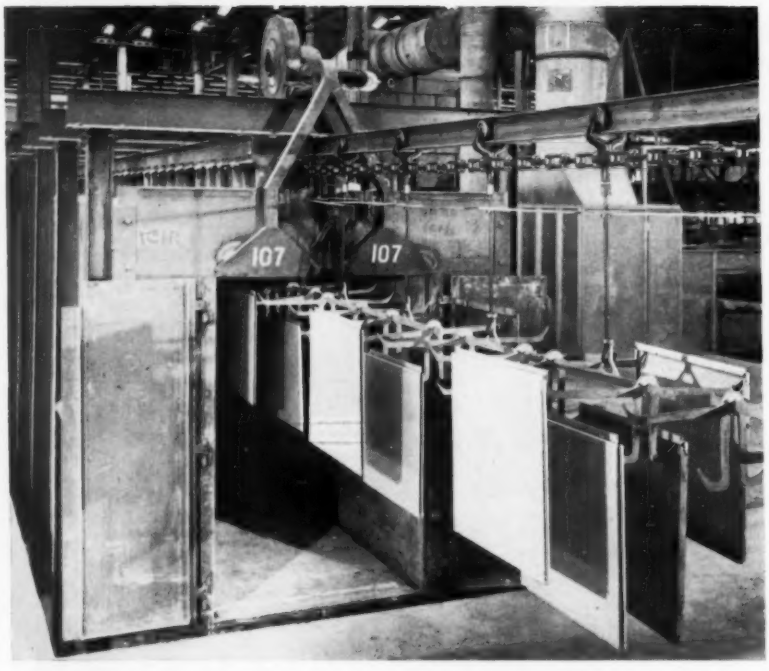
**THE DeVILBISS COMPANY • Toledo 1, Ohio**
Canadian Plant: WINDSOR, ONTARIO

# DE VILBISS

*means* **Quality** *in all four..*

**SPRAY EQUIPMENT**
**EXHAUST SYSTEMS**
**AIR COMPRESSORS**
**HOSE & CONNECTIONS**

# Furnace Installation




### *Nine at Lustron*

**6 furnaces for architectural parts are 180′ long, each having 60′ preheat chamber, 60′ burning chamber, and a 60′ cooling chamber. Tunnels are 48″ wide by 72″ high. Maximum total load 19,200 lbs. per hour, at 1600°F. Fired with 11 combination gas-oil burners in 4 individually controlled firing zones. Furnaces built to operate from 500 to 1600° F. with a variation of ± 10°.**

**2 furnaces for sanitary ware, 150′ long, 50′ preheat, 50′ burning, 50′ cooling. Tunnels 48″ wide by 84″ high. Maximum total load 15,000 lbs. per hour at 1600° F. Fired with 9 gas-oil burners in 3 individually controlled firing zones.**

**1 furnace for miscellaneous parts 121′ long, 42′ preheat, 37′ burning, 42′ cooling. Tunnel 36″ wide by 60″ high. Maximum load 10,000 lbs. per hour at 1600° F. 7 combination gas-oil burners for 2 individually controlled firing zones.**

## *by* BOLAND

Furnace installation by Boland means dependable, long-lasting construction with features not available in any other furnace. Nine complete furnaces at Lustron Corporation, plus the famous Boland FLOATING ROOF on two furnaces by another furnace builder, completes the world's largest porcelain enameling furnace installation. It will pay you to look to Boland for your next furnace job, too.

## ALBERT J. BOLAND COMPANY

**407 NORTH EIGHTH BUILDING • ST. LOUIS 1, MO.**

***Designers and Builders of Continuous and Box Type Enameling Furnaces***

**ING-RICH** *says —*

*Merry Christmas and a Happy New Year!*

To you, and you, and you—to our PORCELFRIT friends everywhere—we send the warmest season's greetings.

It is a time for rejoicing and reverence. It is also a time for soul-searching, when it behooves us to ask ourselves how we can best prolong the spirit of Christmas and project it into our daily lives. Most of all, it is a time to hope devoutly that the nations of this troubled world will learn to follow the teachings of the Prince of Peace.

ING-RICH
PORCELFRIT
"The Plant Tested Frit"

**INGRAM-RICHARDSON MFG. CO., OF INDIANA, INC.**
OFFICES, LABORATORY AND PLANT,
FRANKFORT, INDIANA

# Ten Rotosprays...

## *in the first LUSTRON order*

WHEN Lustron engineers specified equipment for the world's largest enameling plant, they chose Rotospray, the rotary spray sifter, as the standard method of sieving all porcelain enamel slip. Ten standard model Rotosprays were included in the original Lustron order.

Whether you manufacture architectural porcelain for homes, sanitary ware, appliances, furniture, lighting reflectors, signs — or whatever porcelain enameled product you make — be sure your liquid enamel is clean and uniform by using Rotospray, the modern way of sieving enamel slip.

You can improve quality in your finished products, save time and labor in the mill room, and save money in your overall production costs if your plant is properly equipped with the right number and the right size Rotosprays.

To be sure you get the right Rotospray for your job, contact Rotospray direct... or one of our authorized sales representatives.

Sales representatives —
B. F. DRAKENFELD & CO., INC., New York, N.Y.
PEMCO CORPORATION, Baltimore, Md.
O. HOMMEL COMPANY, Pittsburgh, Pa.
FERRO ENAMEL CORP., Cleveland, Ohio and foreign offices
CHICAGO VITREOUS ENAMEL PRODUCT CO., Cicero, Ill.

ROTOSPRAY
(Reg. U. S. Pat. Off.)

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BRAUN KNECHT & HEIMANN CO., San Francisco, Cal.

Foreign representatives —
WATFORD ENGINEERING WORKS, Watford, England
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*ROTOSPRAYS ARE ALSO USED EFFECTIVELY IN CHEMICAL PLANTS, PAPER MILLS, AND POTTERIES*

**ROTOSPRAY MANUFACTURING COMPANY**
**562 WASHINGTON BOULEVARD • CHICAGO 6, ILLINOIS • TEL. DEarborn 2-7196**

# MONARCH Serves Many in the field of Stampings-Assembly Finishing and Packaging . . .

Monarch produces Tank Heaters complete, stamping, assembling, finishing and packing them.

Monarch produces stampings of Washing Machine Legs for many nationally known manufacturers.

Monarch was among the first to produce Washing Machine Lids on a Quantity Production Basis.

Monarch's All-Steel Basement Windows are designed, stamped, assembled, finished and packed by them for direct shipment.

Monarch manufactures internationally used Highway Flares complete, stamping and assembling them ready for bulk Shipment.

Monarch produces nationally distributed Scooters, stamping, expediting, assembling, finishing packing and shipping them.

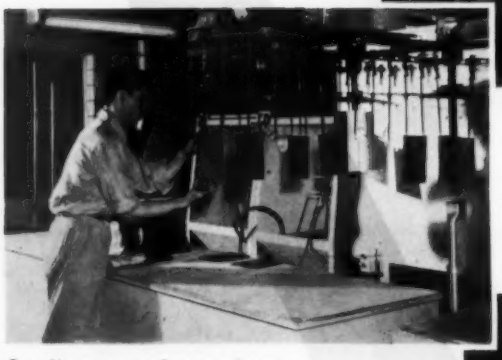
From the assembly line of New Monarch's three modernly equipped plants come many a special part or complete assembly for numerous nationally known products. Many of these have been on Monarch's production line for most of the company's 37 years in the field of Designing, Die Making, Stamping, Finishing, Assembling and Packing. Every day, more and more manufacturers are availing themselves of Monarch's Complete From-Blueprint-To-Shipping-Carton Service. You, too, can profit by adding our facilities and experience to your own. It always pays. Write Today.

*When you think of Stampings, think of*

**NEW MONARCH MACHINE & STAMPING CO.**

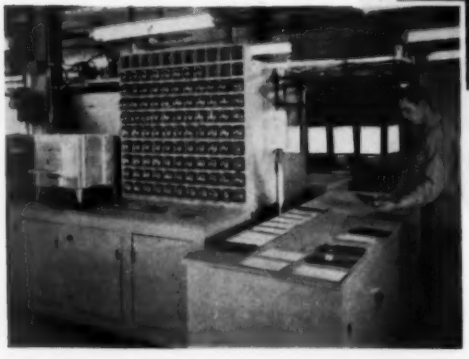
406 S.W. NINTH STREET — DES MOINES 9, IOWA

View in Quality Control Laboratory, showing new miniature continuous electric combination furnace and dryer in background.



Loading ground-coated test panels on furnace chain. Panels are entering drying zone.

Unloading fired, white cover-coated panels.



Visual inspection of fired test panels in foreground. Sheets on furnace chain are entering firing zone of furnace.

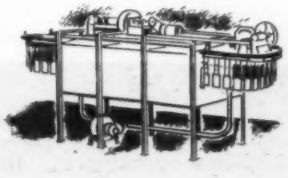
FERRO

# *World's Smallest Continuous Furnace* Production-Proves Ferro Frits*

Your *Ferro Frits*, always tops in workability, are even more uniform and dependable today, thanks to a new Quality Control procedure.

A miniature continuous electric combination furnace and dryer has been added to our Quality Control Laboratory. Equipped with automatic recording controls, this outstanding unit was designed by Ferro Engineers *to duplicate continuous drying and firing conditions* in your plant. Test panels, dried and fired on this equipment and proved for color, opacity, surface texture, gloss, adherence and acid resistance (where necessary) are your *Production Insurance* that Ferro Frit in your shop will meet highest demands of quality, uniformity and dependability.

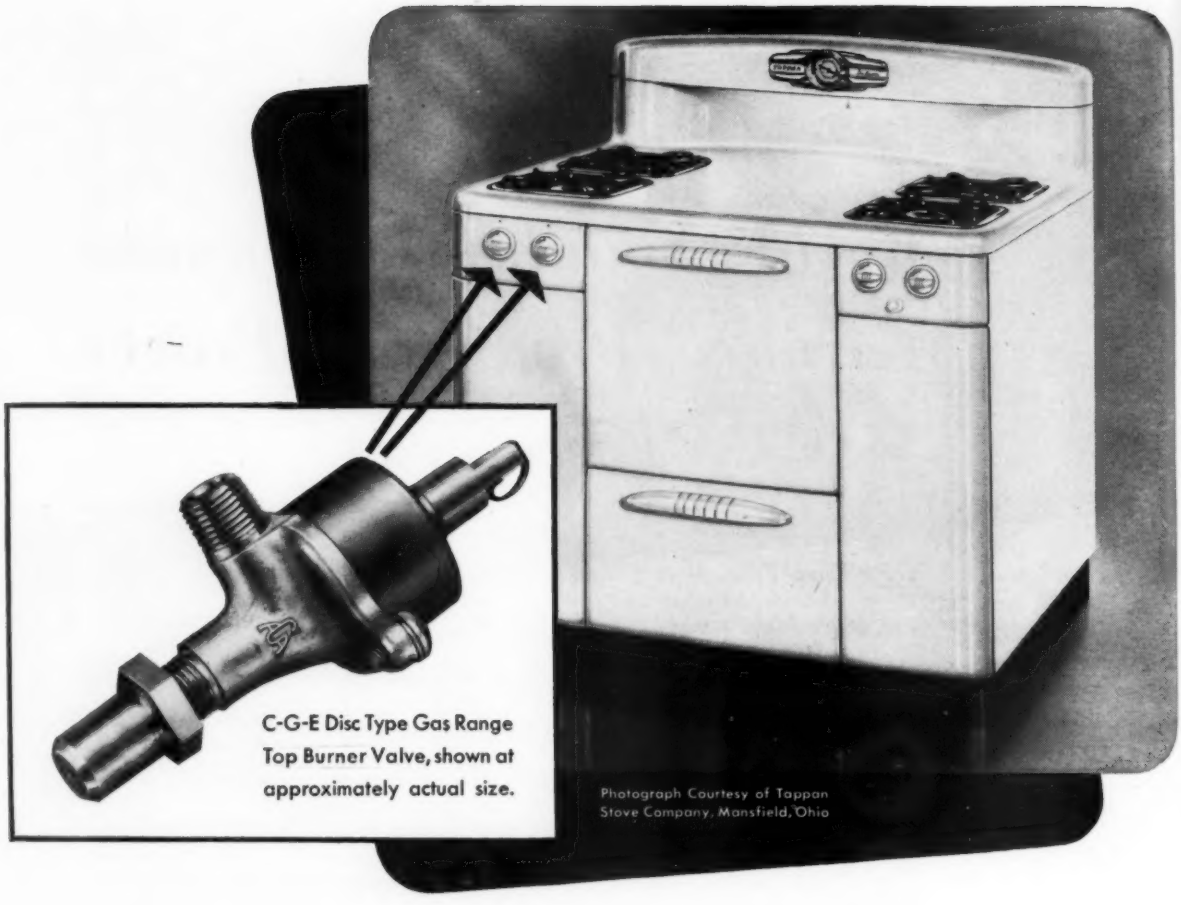
The development of this miniature continuous furnace, the hub of our new, greatly expanded Quality Control Laboratory, represents another step forward toward better Porcelain enameling. If you would like to inspect this unique equipment, or learn more about it, just drop us a note.



*Type: Straight-through
Capacity: 200 6″x 8″ test panels per hour
Firing Zone: 4′ long x 8″ wide x 12″ high
Chain Speed: ½′ to 4′ per minute

**FERRO ENAMEL CORPORATION**

**4150 EAST 56th STREET • CLEVELAND 5, OHIO**



C-G-E Disc Type Gas Range Top Burner Valve, shown at approximately actual size.

Photograph Courtesy of Tappan Stove Company, Mansfield, Ohio

# *Now in Use on this Tappan Range...*

# C·G·E (HIGH-LOW LOCKING) DISC VALVES!

The Tappan Range shown above is now equipped with C-G-E Disc Valves—complete with high-low flame adjustment and safety locking features.

Field experience shows that the flat, forged brass sealing faces in C-G-E Disc Valves eliminate seizure. Minimum contact between body and disc provides perfect sealing, and a more even turning torque during continued or high heat operation. Now available for use with all types of gases.

More and more range manufacturers are switching to this C-G-E Disc Valve because its unique design permits both the safety locking feature and high-low flame adjustment at a substantial cost reduction. Ask for more data and sample of this improved valve—with safety and convenience features that appeal to Mrs. Range Buyer.

**CERTIFIED GAS EQUIPMENT, INC.**
1823 MONITOR AVE. • CHICAGO 39, ILLINOIS

# NEW DATES

## *for the*

## International Home Furnishings Winter Market

## January 3rd to 15th inclusive

Definitely and finally set by the Joint Market Dates Committee, after conferences with all related groups and facilities, this is the last time that home furnishings buyers will have to leave for Market at New Year's.

Exhibitors in The Merchandise Mart will be ready for you with new designs, new products, new promotions. Buyers who want to know the latest trends in Home Fashions will find the answers *here*, because *here* is the largest concentration of related lines (over 2000) in all the world.

But be sure to remake your hotel reservations to fit the new dates!

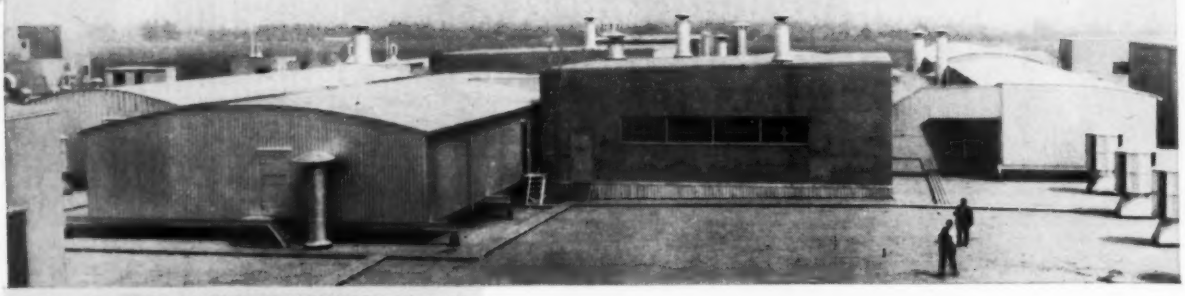
# THE MERCHANDISE MART

***Centered for Efficient Year-Round Buying and Distribution***

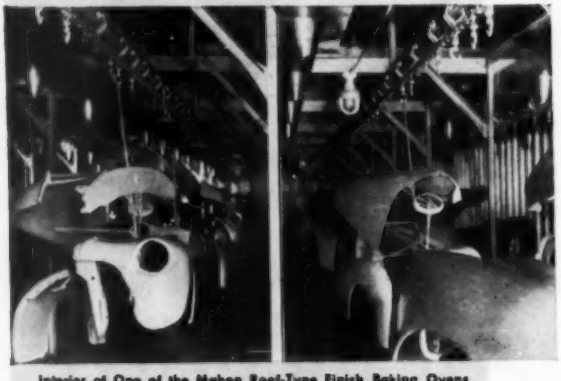
CHICAGO

# COMPLETE *Finishing* SYSTEMS

for ENAMEL • LACQUER • PAINT



Above: View showing five Mahon Finish Baking Ovens Installed on the Roof of an Automobile Plant. Parts are Carried on Overhead Conveyors.



Interior of One of the Mahon Roof-Type Finish Baking Ovens Illustrated Above.

Body Finish Baking Ovens in the same Finishing System were Installed Inside of the Plant and Equipped with Automatic Swing Doors. Suction intakes of the Recirculating Ducts are Located Over Door Openings to Minimize Heat Loss.

## . . . Now is the Time to Cut Finishing Costs with NEW, MODERN EQUIPMENT!

A buyers' market is now definitely in the offing. It will pose new problems for manufacturers in meeting price competition, which is the inevitable result. Right now, is the time to safeguard the future saleability of your product by planning to give it a better finish at lower unit cost. Production costs will have to be reduced all along the line. That is where the Mahon organization fits into your long range planning . . . Mahon engineers will plan, engineer, build and install a Complete Finishing System which will give your particular product the finest finish obtainable at an irreducible minimum cost per unit. You can turn your problem of reducing finishing costs over to Mahon with complete confidence, because, twenty-seven years of experience in this highly specialized field, backed by constant research and pioneering development, have endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere. See Mahon's Insert in Sweet's Mechanical Industries File for complete information, or arrange a consultation at your convenience.

**THE R. C. MAHON COMPANY**

Home Office and Plant, Detroit 11, Mich. • Western Sales Division, Chicago 4, Ill.

**Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning Machines, Rust Proofing Machines, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Units, Drying and Baking Ovens, and Paint Reclamation Units. Also Core Ovens, Hydro-Foam Dust Collectors, and many other Units of Special Production Equipment.**

# MAHON

# THE Finish Line

**THE FIRST FIVE YEARS** — in the life of *finish* closes as this issue of the publication goes to press. This seems an appropriate time to thank the plant men and executives throughout the appliance and metal products industries for the wholehearted cooperation extended to *finish* during this five-year period.

The doors to all plants have always been open to *finish* and the best minds who head the fabricating, metal preparation and finishing departments have been most generous in sharing their information and experiences through our editorial pages for the advancement of industry in general. If — as many, many readers have written and said — our feature plant articles, technical data and industry news have been helpful to them, much credit goes to these men who have written or furnished editorial information. With this help, *finish* will continue to grow and broaden its services to the producers of metal products.

Now look at the advertisers' index and, as a reader of *finish*, you will see the blue ribbon list of manufacturers of raw materials, equipment and product components that make it possible for us to send this publication to your home or office desk each month without cost to you (if you live in the U.S.A.). Your loyalty to *finish*, as a reader, makes it practical and profitable for these companies to present their product stories through its advertising pages. As this "blue ribbon" list grows *(the average increase in advertising sales has been over 30% each year for five years, and this year will show a 56% gain over 1947)*, so the publication will continue to grow to give you new features and a correspondingly greater quantity of editorial information.

---

### The refrigerator exterior

A circulation information form from a reader, received November 11, contained this comment: "*Keep up the missionary work for porcelain enamel refrigerator exteriors— I don't know a more effective medium than FINISH.*"

Regardless of the "effectiveness," you can bank on it that we *will* continue to harp on this and other subjects which we are convinced will benefit manufacturers and users alike.

As for refrigerator exteriors of porcelain enamel — they *will* be back. Although little is being said by producers *now*, they have *not* been forgotten. The porcelain enameled exterior of the future will be completely redesigned to take full advantage of the enameling industry's latest developments in easy-to-clean, non-fading, and practically everlasting metal finishes.

Several factors will enter into the determination of the time element. First, time for design, tooling and, in some cases, new finishing facilities. Second, the speed with which we return to a competitive market, making quality and sales features of paramount importance for successful competitive selling. There is a valuable *existing* market *now* for porcelain enameled exteriors among present users. It will expand rapidly when the first porcelain enameled exteriors are on the market and forcefully presented through sales and advertising. We believe the top sales executives of the major refrigerator manufacturers *know* this. We will hope to be among the first to announce these new developments when they reach the announcement stage.

---

### The "safe transit" program

(see news report on page 23)

The program for the reduction of losses in finished products during transit from the shipping room to the ultimate consumer is rolling along with steadily increasing momentum. This program, initially projected by *finish*, owes its early success to the alertness of the officers and executive personnel of the Porcelain Enamel Institute, plus the hard work and forcefulness of those heading the technical and management aspects of the project.

Never have we observed a project of national scope that has sparked a more enthusiastic and unanimous response from all interested segments of industry. The coordinating committee, the carriers associations and the representatives of the major metal products manufacturing associations now see eye to eye on the plan of attack.

If, as expected, the individual manufacturers fall in line with the same speed and enthusiasm, it is entirely possible — in fact, probable — that the tragic losses in shipping and handling may be reduced by as much as 25% within a few short months. As all readers know, this means millions of dollars — not pennies.

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Yours for better editorial service during the *next* five years.

Dana Chase

EDITOR AND PUBLISHER



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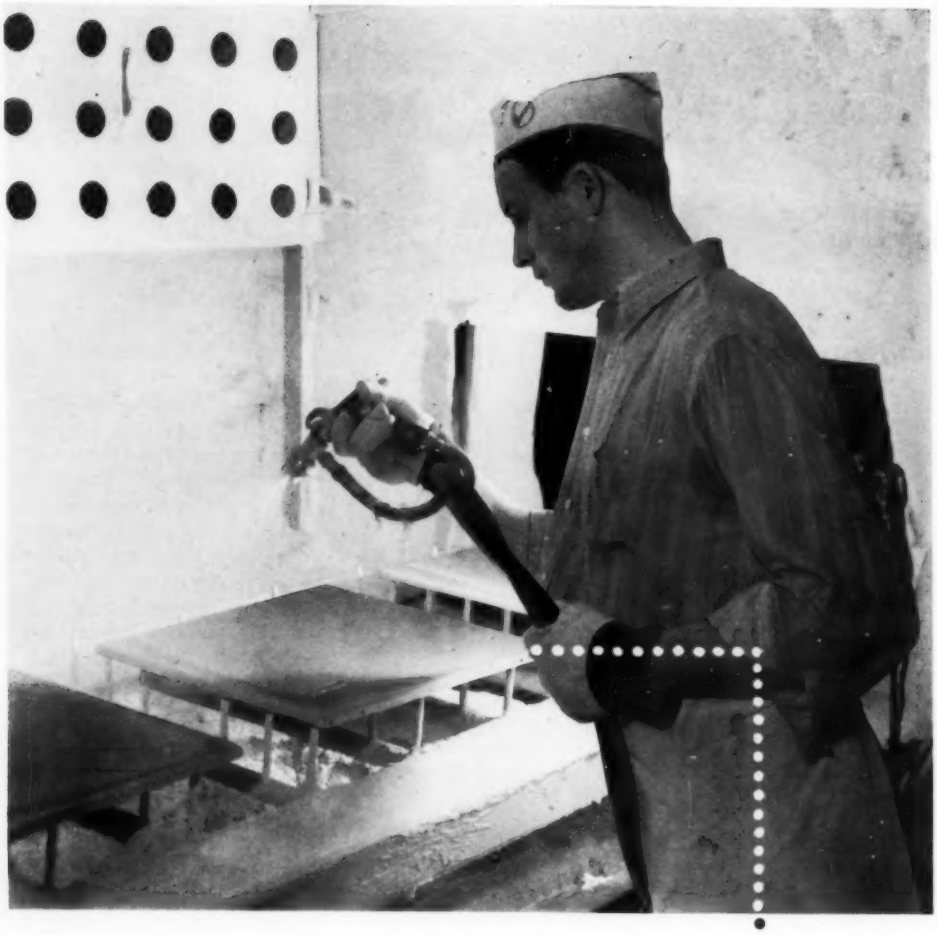


# Sheets That Take a "DOUBLE GRIP" on Porcelain Enamel

That's what you get when you use Inland Enameling Iron Sheets in fabricating your enameled products. A special-textured surfacing process—developed by Inland metallurgists—makes it possible for the ground coat to become *chemically fused* and *mechanically keyed* to Inland Enameling Iron Sheets. That's "double-grip" action . . . insuring double-tight adherence of enamel to base.

What's more, customers report they save time and money because the textured surface of Inland sheets permits controlled chemical fusion to take place in the shortest possible time and at the lowest possible temperature. To find out how Inland Enameling Iron Sheets may be of help to you, write for complete facts. INLAND STEEL COMPANY, 38 S. Dearborn St., Chicago 3, Ill. Offices: Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

INLAND STEEL

## INLAND ENAMELING IRON SHEETS

OTHER PRODUCTS: BARS • STRUCTURALS • PLATES • SHEETS • STRIP • TIN PLATE • PILING • FLOOR PLATE • RAILS • TRACK ACCESSORIES

# A continuous furnace enameling plant for refrigeration products

## porcelain enameling operations at new International Harvester plant in Evansville

*By Gerald Eldridge Stedman*

Exclusive feature finish

The Refrigeration Division of International Harvester Company was formed in July, 1944. At first a group of engineering personnel were housed at the company's McCormick Works in Chicago. Here the first models of home freezers and home refrigerators were developed which comprise the vaulting production of the division's Evansville, Indiana, operations, now one of the 22 manufacturing plants which form the extensive International Harvester production setup. This was my 999th plant visit since 1942. I desire particularly to report some of the distinctive factors observed in the porcelain enameling practice there, much of which was the origination of Joseph Baker, superintendent of porcelain enameling.

In January, 1946, I-H bought from the War Assets Administration, the efficiently modern Evansville plant, in which formerly the Republic Aviation Corporation had produced P-47 Thunderbolts. Nearly $6,000,000 was paid for buildings and property. Such complete new equipment was installed as to represent over $6000 investment for each employee now on payroll.

### Total plant area

Plant area covers 71 acres, with 61 acres under roof or on concrete. There is over 1,000,000 sq. ft. of floor space. The first milk cooler was turned out 27 days after plant occupancy. I-H now produces five milk cooler, three freezer chest and three home refrigerator models at this Evansville plant, along with production of I-H truck hub caps as well as drum assemblies for the new I-H cotton picker, for which final assembly occurs at its Memphis Works. The Evansville plant, at full production, will produce better than 1000 finished refrigeration products daily.

Output of the Refrigeration Division for the first six months of 1948 represented a 502 per cent increase over output for the like 1947 period, with the tremendous increase due to the fact that the 1947 production represented the initial production of the plant. At the time of my visit, the run of the porcelain enameling department was entirely in refrigerator liners. The holloware line was scheduled to begin production the first week in August, such holloware porcelain enameling having previously been accomplished by outside sources, largely in Tennessee.

### Initial production

Previous to the organization of the Refrigeration Division, I-H production had required little porcelain enameling and consequently the company had little experience with it. Initial production was attained in milk cooler and freezer chest components, whose interior and exterior finishes were baked synthetic enamel over bonderized surfaces. Initiation of production for household refrigerators, in three models, all 8 cu. ft. size, moved slower and brought with it the need for porcelain enameling facilities for its liners. J. J. Baker joined I-H at Evansville in November, 1946, and has been quite largely responsible for layout, setup, training and present function of its porcelain enameling practice. Baker initiated plans and procedures which, altered and approved by I-H's engineering department, are now in two-shift liner and holloware production at capacity within 16 months from scratch, and with ample provision for expansion.

Presently, production follows a single furnace layout and uses a 54′-0″ hot zone "U" type radiant tube furnace. It is distinguished by the compactness of its production within the floor area assigned. All dryers operate aloft. By unusual materials handling and excellent conveyorizing, making maximum use of all opportunities in elevation, the I-H layout is an efficiently modern example of the possibilities of considering cubic rather than merely square feet in effective departmental layout.

### Twin furnace plant approved for the future

Planning for the future, a twin furnace layout has been approved. This twin layout is known as "schedule B", and can be installed at any time without jeopardizing production. The changeover will merely require moving out the pan line, adding one mill; installing an additional overhead storage conveyor, and additional storage tank capacity for mill enamel, another shift to double the spray and pickling production.

### Three-system drain

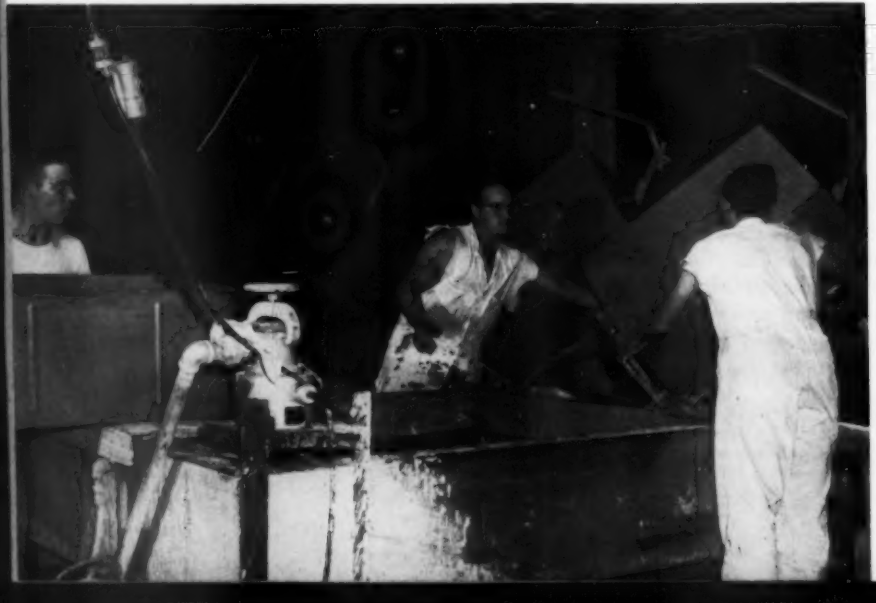
One of the unusually distinctive features of the plant layout is the use of a three-system trench with gratings into which everything drains. These drain into a slag collection pit which has three sections, settling out all water before entering the sewers. The layout has no sewer pipes to add to maintenance troubles. These trenches replace all piping. In certain locations, trenches are open for fast slag draining. This is the neatest setup I have observed.

Presently, 8 cu. ft. liners are on the porcelain enameling line. Hangers of unique design can accommodate the liners, and simultaneously

*Showing method of loading holloware into large baskets used in pickling room.*

*Baskets leave dryer by power conveyor, then are transferred to roller conveyor.*

*Two dippers and helper handle 150 liners an hour. Dip tank is water-cooled.*



can carry holloware in tandem, enveloped under the liner at the same drainage pitch and riding free. This hanger design provides knife edge face side suspension and has sawtooth steadyrest, positioning all ware at the proper angle for uniform draining.

Dimensions of the 8 cu. ft. liner are approximately 38″ high, O.D.; 26¾″ wide O.D.; 15½″ deep, O.D. Holloware, such as pans and meat trays, will ride the same hangers, snuggling under the liner shell and with the same drainage efficiency.

### Water-cooled, recirculating ground coat dip tank used

The water-cooled, recirculating ground coat liner dip tank is 4′0″ wide, 5′0″ long, and 1′0″ deep, equipped with a 4′6″ wide and 5′0″ long drain board, two operators working, one to each side. The drain board has a fixture to hold and drain two liners. Enamel collected on it is screened through a pump and magnetic separator before being returned to tank for recirculation.

The I-H porcelain enameling furnace conveyor chain lines have a total length of 408′, with hanger spacing of 64″ O.C., the line carrying 76 hangers. Operating speed, originally scheduled at 13 FPM, now moves at 17 FPM through a 54′0″ hot zone. Original cycle time was 31.385 min., using a drying or burning time of 4.15 min. This has since been considerably improved.

The ground coat dryer line has 782′ length with hanger spacing of 48″ O.C., and carries 219 hangers each handling one liner. This line originally moved at 7.0 FPM, and now travels at 10 FPM. The equipment is sized to handle approximately 1800 liners in 7.5 hours at a maximum conveyor speed of 19.5 FPM, when running solid ground coat load in the furnace. The speed, however, is cut in half when running ground and cover coat together. Ground coat conveyor chain has five 180° and ten 90° turns with 4′0″ radius, there being 160′ of chain in the 3-pass ground coat dryer.

The cover coat dryer line has 664′ length, hanger spacing of 48″ O.C. with 166 hangers, each carrying one liner. Original conveyor speed was

9.75 FPM and has now been stepped up to approximately 15 FPM. Total cycle time originally was 68.1026 min., with production of 2.4375 pcs./min., and drying time of 16.8418 min. This has been improved. Cover coat conveyor chain has four 180° and ten 90° turns of 4′0″ radius, and 150′0″ of chain is in the dryer. Dryer operates at 225° - 450°, and dries at 400° F. when chain moves at 19.5 FPM. A tunnel encloses the conveyor line between spray booth and dryer to keep dirt off the wet ware. The brushing booth is a dry type booth with a grating located above a floor pan 36′ long extending below the work. The space between the grating and the floor pan is exhausted by two propeller fans having a combined capacity of 47,000 CFM. The booth is 38′0″ long.

The hydro-filter cover coat spray booth is 52′ 7″ long and has an exhaust capacity of 100,000 CFM with an air supply system of 110,000 CFM capacity. The last 10′ of this is divided from the rest of the booth so that the overspray from the acid resistant spray section will not contaminate regular white overspray. Liners travel tilted through the spray booth to simplify spraying tops. Top of liner travels 6′ above the floor. The spray booth is designed to be washed down inside with water.

### Tandem swivel baffles used in all plant spray booths

A unique development in this booth, and being used in all spray booths of the plant as well, is the installation of tandem swivel baffles spaced each four feet. They open on separate hinges and pull forward, permitting operators to do thorough cleaning in a greatly simplified manner. This arrangement reduces stack losses of enamel as well as greatly economizing on enamel waste. Another original detail is found in a 4′ joggle of the conveyor chain as it enters the cover coat spray booth, keeping booth and work much cleaner. There is presently considerable experimentation with shields riding on hangers above the work to eliminate any chance of soilage by chain dust. Much unusual caution is used to prevent negative effects of chain move-

*After dipping, liner is dated and beaded. Note especially designed hangers.*

*Baker demonstrates tandem swivel spray booth baffles for easier cleaning.*

*Conveyors minimize manual handling. Photo shows dryer and furnace conveyors.*

*Photo shows tooling used for conveying liner through radiant tube furnace.*

*Baker, center, with two staff members, Howard Drake, left, & Sheldon Lloyd.*

*Hangers can accommodate all liner sizes. Holloware rides under liner shell.*

ment on porcelain enameling everywhere in the department.

The holloware porcelain enameling line was being given final make-ready for operation on my visit. The ground coat pan line conveyor chain has 168′ length with 24″ hanger spacing and carries 84 hangers of one-pan capacity. Operating speed is 29.25 FPM with min.-max. drive speeds of 17′-51′, a cycle time of 5.7436 min., 14.625 pcs./min. The cover coat pan line has 116′ length with 24″ O.C. hanger spacing, carries 58 hangers of one pan capacity, moves at 29.25 FPM, and has a min.-max. drive speed of 17′-51′, a cycle time of 3.9658 and a production of 14.625 pcs./min.

The ground coat pan line is sized to handle 2310 pans in 7.5 hours, giving a maximum conveyor speed of 27 FPM. A plain dip tank, 3′ wide x 4′ long x 2′ deep I.D. is portable and equipped with semi-swivel casters. Uniquely designed fixtures on the conveyor chain hold pans in drain position as they move along. A 40′ drain trough is located under the conveyor and drains towards the dip tank. A 72″ long x 24″ high infra-red unit dryer is used on this line.

The cover coat pan line is sized to handle 2520 pans in 7.5 hours, giving max. conveyor speed of 27 FPM. The line uses a plain 3′ wide x 4′ long x 2′ deep (I.D.) dip tank of the same portable nature previously mentioned. A 72″ long x 24″ high infra-red unit dryer is employed, drying being aloft. Common to both pan lines are two 2′ long x 3′ wide enclosed conveyor fixtures washing units.

**Pickling procedure**

The pickle room is set up to handle 70 baskets in one 8 hour work shift. Pickle baskets are 12′9″ long, 5′0″ wide, 5′6″ high (I.D.). The load is 16 liners or 312 pans to the basket. Ingenious loading fixtures in those baskets give liners steady rest and proper pitch to drain and to prevent air pockets.

The pickling sequence is somewhat distinctive in using precleaner and double rinse after the cleaner bath. Tank size is 13′9″ long, 6′

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# PEI "safe transit" program

## given industry-wide endorsement

EFFORTS of the Packaging and Shipping Committee of the Porcelain Enamel Institute were crowned with a large measure of success realized through unanimous endorsement of its "safe transit" program for packaged porcelain enameled goods. Endorsement not only by three major carrier associations but by representatives of the trade associations of the manufacturers of major home appliances was revealed during the Institute's 2nd Annual Sales and Management Conference held at Hotel Stevens, Chicago, October 28.

### The beginning

The "safe transit" program, originally suggested by *finish* and initiated only this last August under the sponsorship of the Porcelain Enamel Institute, was established to find ways and means of assuring safe delivery of packaged porcelain enameled products to their markets, thereby accomplishing reductions in freight losses and claims. By-product advantages of the program are also expected to include improved dealer and public relations, with a strong possibility of overall cost reductions for the manufacturers.

### Immediate aim

The immediate aim of the program has been to establish standardized preshipment tests for packaged products which will assure their safe delivery under normal transportation conditions. Progress to date has included selection of necessary testing equipment and agreement on the part of three major carrier groups, The Association of American Railroads, American Trucking Associations, and Railway Express Agency, Inc., regarding the severity and duration of necessary tests. (The Air Cargo group has also indicated its interest in cooperation.) The endorsement of the program by the carriers was augmented during the meeting by the further endorsement of appliance industry manufacturers' representatives, including:

Ray H. Thompson, chairman, traffic committee, American Washer & Ironer Manufacturers Association.

Harold Massey, assistant managing director, Gas Appliance Manufacturers Association.

H. R. Folgers and Ed Zelinski, unofficial observers, National Electric Manufacturers Association.

V. W. Veno, Institute of Cooking

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**Editor's Note:**

**This report shows the speed with which each hurdle has been cleared for all-out support of the PEI "Safe Transit" program.**

**Now comes the time for acceptance and speedy action by the individual manufacturers of finished products.**

**The program should get the unqualified endorsement and *active* support of every manufacturer as he is contacted by his association representative.**

**There can be only one result — worthwhile reduction of shipping losses with resultant saving to *every* manufacturer participating in the program.**

*Among the representatives of trade associations and carrier associations who participated in the meeting during the Sales and Management Conference were: Front row — Prof. F. A. Petersen, EUMC; Maurice R. Ely, NESA; W. L. Yingling, American Trucking Associations; E. H. Shands, PEI; R. F. Bisbee, PEI; A. L. Green; Association of American Railroads; and H. R. Folgers, NEMA. Back row — Dana Chase,* finish; *E. C. Manthei, Impact Register Co.; Ray H. Thompson, AWIMA; J. C. Van Nordstrand and A. E. Dowling, both of Railway Express Agency; C. S. Bather, PEI; H. Geo. D. Nutting, L.A.B. Corp.; Harold Massey, GAMA; and Ed Zelinski, NEMA.*

finishfoto

# SNAPSHOTS FROM THE ANNUAL AGA MEETING

(See story in November *finish*)

*Top row: Left—Refreshment time at A. O. Smith Corp. booth. Right—Men behind working model of an electric pipe mill in Youngstown Sheet & Tube booth include E. H. Hendricks, YS&T; D. A. Davis and J. A. Mussler, both of Pittsburgh Continental Supply; and G. V. James, YS&T.*

*Second row: Left — Men viewing Hardwick stove featuring single point ignition are Walter McKie, Rochester Gas & Elec.; G. M. Rohde, Jr. and Wayne Bovee, both of Hardwick Stove; and D. A. Hulcy, Lone Star Gas Co. Right — In Robertshaw Fulton Controls booth are Fred G. Shupp, and Joe Taylor, both of Anderson Stove; and A. W. Beck and A. E. Gabris (hidden) both of Robertshaw Fulton Controls Co.*

*Third row: Left — Refreshment time at booth of Rheem Mfg. Co. Right — Stanley Little, of American Stove Co., with "Herman the Magic Chef" showing the new Magic Chef range.*

*Bottom row: H. Carl Wolf, managing director of AGA; H. C. Cuthrell, chairman of mfg. gas dept. of AGA; J. A. Robertshaw, retiring GAMA president; H. W. Reed, retiring AGA president; R. W. Hendee, AGA president; F. J. Nugent, GAMA president; S. H. Hobson, 1st GAMA vice president; John Van Norden, GAMA treasurer; and H. L. Whitelaw, GAMA managing director.*

**finishfotos**

# Application of cover coat enamel directly to steel

## A PROGRESS REPORT

**background information, an outline of experiments and production tests, and some practical suggestions for those who would try the system**

*By E. H. Shands* • DIRECTOR OF ENGINEERING AND DEVELOPMENT, GEO. D. ROPER CORPORATION, ROCKFORD, ILLINOIS

finish

The application of cover coat enamel directly to steel is a subject that has been in the minds of enamelers for many years, evidenced by the many attempts on the part of enamelers to accomplish this feat over the past 25 years. All attempts to apply white directly to steel were by no means failures. Fair results were obtained, and some looked to be successful except for the frequent lack of consistent results in production. These inconsistent results could have been caused by the narrow working range of the system which made the process impractical for production. The only sheets available in production quantities were hot roll, cold rolled, and enamel sheets.

### Background facts on "direct-to-steel" enameling

In 1942, G. F. Comstock, of Titanium Alloy Manufacturing Company, presented a paper before the American Society for Metals, pointing out that the addition of titanium to a drawing sheet in the ratio of 4 titanium to 1 carbon would eliminate the yield point, eliminate age hardening of the steel, and would prevent strain lines in the drawing of parts where this tendency existed. Mr. Comstock pointed out that by the addition of titanium in the above proportion, the carbon would be tied up as titanium carbides.

Shortly thereafter, J. H. Nead, chief metallurgist of Inland Steel Company, ran a heat of steel according to Mr. Comstock's recommendations to prove Mr. Comstock's contention. Samples of this lot of steel were also enameled with cover coat directly on the steel and were found to produce good bond and showed no signs of boiling under laboratory conditions.

Early in 1944, F. R. Porter, of Inland, ran a number of samples in our enamel plant under production conditions and confirmed the laboratory results. These results were so encouraging that the management of Geo. D. Roper Corporation requested from the Inland Steel Company and received a number of these sheets for further experimental work.

These trial sheets were used in the formation of more complex shapes as used in the Roper gas ranges. We found that while these sheets were somewhat stiffer than ordinary deep drawing sheets, or even normalized sheets, the drawing property was equally as good from the standpoint of tearing as was the deep drawing sheet and, in many cases, better. There was, at that time, a tendency towards spring-back where 90 degree flanges were drawn. Further work on the part of the steel company metallurgist eliminated this condition. These parts enameled readily, producing good bond, and still showed no boiling tendencies. These parts showed remarkable stability in firing in that there was much less warpage than was ordinarily encountered with commercial enameling sheets, and sagging tendencies were also much reduced. This further convinced us that this sheet had real merit.

### Cooperative plan launched

Late in 1944, the management of Roper Corporation arranged with Inland Steel, three frit manufacturing companies, the producers of ti-

*Tandem type booth for the application of the cover coat enamel.*

tanium, and representatives of some users of enameled products, who had also experimented with this type of steel, to join with us in conducting a production test using titanium bearing steel. Accordingly, we agreed to manufacture 150 complete gas ranges using titanium bearing steel on all white parts. Each of the three frit manufacturers were allotted parts of the manufacture of 50 ranges, with extra parts allotted to them to cover normal scrap.

Having had little forewarning that this test was to be run, the frit manufacturers had no choice but to select a frit for this test that was being currently manufactured by them. Based on their experience in working with titanium bearing steel, all frit manufacturers elected to use zirconium enamel since this type produced the best bond at that time.

### Plant and field results

Results of the first day's run on these range parts convinced us that the problem of application and control was serious. By far the greater percentage of rejections were caused by improper processing. The greatest difficulty encountered at this time was that of uniform spraying of enamel. Twenty grams per square foot of enamel was applied on the first coat. At points where the enamel was thin, particularly on the radii along the edge of flanges, etc., and at points where the enamel was particularly thin, burning off occurred. Where this burning off occurred, rework and reclamation of the part was difficult. In almost all cases, however, where proper reclamation was made in the first coat, acceptable ware came with the second coat in high percentages. Even after we had encountered the difficulty in running these parts and proper reclamation had been made, our average application for the finished product was slightly under ten-thousandths inch, which was approximately five-thousandths less enamel than was being called for in our current processing.

After the parts for the 150 ranges were completed, the ranges were assembled with practically no assembly line loss. The ranges were shipped to one particular area and have proven to be highly satisfactory since we have not been called upon to replace any of the parts of these ranges. These parts could not have been replaced from our current stock, since our parts were brushed at that time, and there was no brushing on the 150 ranges we made from the titanium bearing steel.

### Pickling practice critical — nickel flash a necessity

At the time this production run was made, records of the run were carefully kept. The analysis of these results convinced us that pickling was one of the major problems. Iron salts adhering to the surface of the ware prior to spraying with white were found to create erratic results: they could either cause serious blistering or discoloration of the white enamel, or both. Nickel flash was absolutely necessary to produce satisfactory bond. The control of the application of nickel was highly important. It appeared that the proper application of nickel was somewhere between .08 and .120 grams of nickel per square foot, both sides, in order to produce proper bond. Experience since that time has proven this to be true. Where the pickling was done properly, applying the proper amount of nickel and using every precaution for eliminating iron salts on the surface of it, no particular injurious effects were found where the sheet was metal finished or where it was welded, provided the welding rod used was of the same analysis as the sheet.

Considering further the results of the production run, a need for an enamel with greater opacity than was available at that time was apparent. It was felt by those who witnessed the test run that a great advantage in this process could be gained by the development of a frit that would develop reflectance in excess of 75% with the application of not more than .005 inch in thickness. Also, a great advantage could be gained for such parts as range tops and refrigerator liners if this finish could be Class A stainless. At that time, this seemed to be highly improbable, if not impossible.

### Frit developments — temperature and color characteristics

Early in 1946, titanium bearing enamels were introduced by the various frit manufacturers which not only made it possible to apply the enamel at a thickness of .005 inches which was highly desirable but, also, which had a PEI rating of Class A

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*Typical all-white range top as used on latest model Roper ranges. This article includes processing information.*

# Improved packaging for neon signs

*By Walter Freel* • TRAFFIC MANAGER, NEON PRODUCTS, INC., LIMA, OHIO

IMPROVED packaging and crating of porcelain enamel neon signs, with resultant reduction in damage claims and a continuation of present shipping rates apparently will be the net result of a meeting between shippers and carriers in Chicago in late September (27th).

One good customer of porcelain manufacturers has been the neon sign industry, using millions of square feet of porcelain annually. The neon industry has been plagued with damage in transit, the damaged signs creating shortages, customer dissatisfaction and costly claims against the carriers.

Because of continued and mounting claims, in March the railroads proposed to the Consolidated Classification Committee that freight classification on neon signs be increased from one and one-half times first class to four times first class. They justified their claims by referring to the loss and damage claims filed against them.

The neon sign industry, for some reason, did not learn of the proposal until a few days before hearings were scheduled to start. Because such an increase would place an impossible burden on the distribution cost of neon signs, interested shippers quickly called a meeting, requested and received a postponement of the increased rate hearing.

In the interim between March and September, four meetings were held between shippers, Classification Committee representatives, and the carriers to see what could be done.

The net result was a counter proposal by the shippers in which new packing and crating specifications for neon signs were worked out by the three groups. Although there has been no official action, it is the belief of those interested that the proposal of the shippers will be accepted by the Classification Committee and the present rates retained.

### Porcelain enamel represents small percentage of damage

Admittedly, the most fragile part of a neon sign is the neon tubing mounted thereon and the porcelain sections of the sign run a poor second. Actually, it is only in a small percentage of damage claims that the porcelain enamel is broken.

Crating specifications now set

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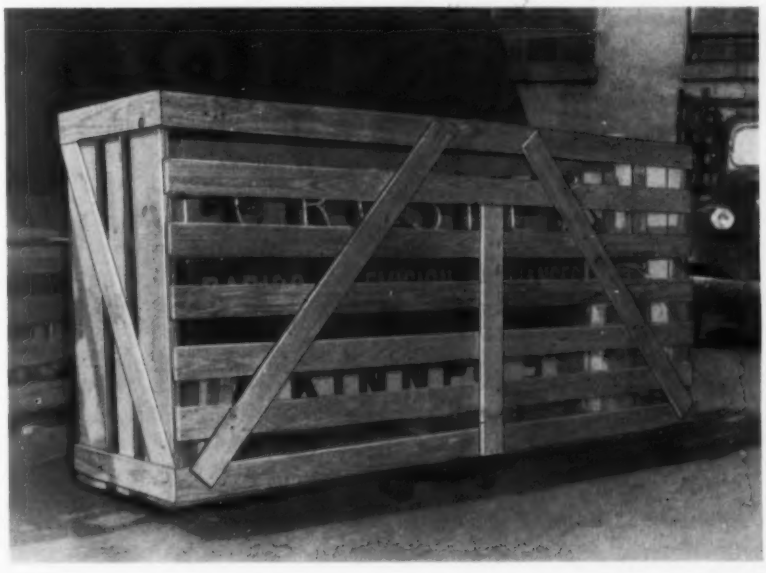

*These photos show one method of crating an outdoor neon sign with a porcelain enameled face. Rubber bumpers are used on the top and bottom where the sign itself comes in contact with the bracing.*

# Porcelain Enamel Institute

## second sales and management conference

### reduction of shipping losses is paramount subject discussed

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THE 2nd Annual Sales and Management Conference of the Porcelain Enamel Institute, held in conjunction with the 17th Annual Meeting at Hotel Stevens, in Chicago, October 28 and 29, was termed a very successful and well attended meeting. Thursday was set aside for the Conference, with the Annual Meeting held on Friday.

The Thursday morning session was devoted to subjects on general trends in the industry, while the afternoon was given over to the paramount problem of reducing shipping losses on porcelain enameled products.

Following registration in the lower tower foyer, the general session was opened in the upper tower at 9:30 a.m. with C. P. Lohman, chairman of the Conference Committee, presiding.

After the address of welcome by C. D. Clawson, PEI president, Lohman discussed "Let's Look Ahead," stressing intensive planning, promotion and selling of the industry's products.

*D. H. Malcom*

**Gambling and business binoculars**

In "Can You Afford to Gamble?", D. H. Malcom, co-chairman of the PEI Market Development Committee, stated that planning for 1949 must be based on a peace time economy, and that we must not gamble the future on war. He stated that higher prices are putting a brake on consumer goods. Companies will have to get out and increase market activities because 10 per cent more goods were produced than sold last year. As an example of market promotion, Malcom cited the radio industry which entered a very competitive market a year ago, but, because of market activity, sales dropped off only 10 per cent.

F. C. Woleslagle, chairman, Commercial Research Committee, then spoke on "Commercial Research — Business Binoculars." The purpose of commercial research is two fold, he stated, analyzing a product and finding a market for it, or analyzing a market and finding a product for it. Market possibilities for sales of durable goods are furthered by the fact that 2,000,000 persons are getting married each year; also there are 10,000,000 more people over 21 than in 1940. Danger signals pointed out by Woleslagle include less family savings, higher loan rates, and stricter credit controls.

Howard N. Williams, co-chairman of the Conference Committee, followed with "We've Come a Long Way — Where Are We Going?". Even though our enameling industry has over 2000 years of experience behind it, "We've slipped a lot and are losing markets every day," according to Williams. There's a golden market for small porcelain enameled products, similar to the present market in telephone dials, but the industry must go out after the business, he concluded.

"Appliance Designing with Porcelain Enamel" was the subject discussed by W. J. Russell, vice president in charge of engineering and development, Landers, Frary & Clark. One of the big appliance headaches is a loss of pre-war ingenuity, but many plants are overcoming this obstacle by instituting training programs. Another big problem is the rapid acceleration of production, hampered by the limitation on steel. Russell said that "we haven't found any finish equal to porcelain enamel at a competitive price."

*F. C. Woleslagle*

**Porcelain enamel preferred**

In "The Place of Porcelain Enameling in the Finishing Field," R. J. Bond, manager, stove Division, Montgomery Ward, reported that in a survey conducted by his firm in 1943, the answer to the question "Which finish do you prefer?" was overwhelmingly in favor of porcelain enamel. He said that the reasons for this high percentage of preference were evident in the answers to the other parts of the questionnaire. "Porcelain enamel has a very important place in the finishing field for

household appliances. The main point which I want to make is that the position is a very vulnerable one," emphasized the speaker.

Continuing, Bond said "It should be a frightening thing to your industry to realize the amount of ill will that is caused by the damage to porcelain enamel parts of appliances." The remedy is "obviously, to reduce the amount of damages and to regain your customers' good will. Important steps have been taken in the formation of committees to study the problem and take action. The plan of action is excellent," Bond said in conclusion.

*W. J. Russell*

### A case for advertising

The final subject on the morning's program was "The Effectiveness of Trade Paper Advertising," presented by Robert J. Ritchey, PEI vice president, by means of a slide film recording. The presentation showed that firms whose advertisements reach key men in specific fields have a definite sales advantage over competitors who do not advertise in the same field. The film was a documented presentation of the advantages of trade paper advertising and its place in the sales picture as a sales economy and preface to effective direct selling.

### Criteria for product acceptance

At the noon luncheon in the lower tower, J. Stevens Stock, senior associate, Opinion Research Corp., listed six criteria which must be weighed to determine whether the public will accept a product. Those six criteria are style, prestige, quality, availability, features, and price.

### Hommel reports on International Congress

Following this, Ernest Hommel, president, The O. Hommel Co., reported on his personal observations at the First International Congress on Porcelain Enameling, held in London, September 28-30. Hommel said that the Conference was very similar to the PEI Forum, and consisted almost entirely of technical papers. The visiting enamelers were conducted through several of England's largest plants where the production of items such as stoves may run up to 600 units a week. A number of those in attendance at the Congress expressed a keen desire to attend the 1949 PEI Forum at Ohio State University, in Columbus, he stated. (Richard Turk, president, Pemco Corp., official PEI representative at the International Congress, was unable to attend the PEI Annual Meeting.)

### Plan for the reduction of shipping losses

The entire afternoon session, presided over by R. F. Bisbee, chairman, PEI Packaging and Shipping Committee, was devoted to a panel on "A plan to reduce shipping losses on porcelain enameled products."

The program was opened by C. D. Clawson, Institute president, who pointed out that safe shipping was the concern of everyone in the industry. Then Edward Mackasek, PEI managing director, outlined the organization of the Packaging and Shipping Committee, stating that the Committee was a "monument to the porcelain enameling industry."

The objectives and procedures involved in the plan were presented by Mr. Bisbee, with E. H. Shands, chairman, Technical Planning Division, following with a discussion of a standardization program on tests to which packaged articles may be subjected to give assurance that the product will not be damaged in transportation from the time it leaves the shipper's assembly line until it reaches the final destination.

E. C. Manthei, chief engineer, Impact Register Co., demonstrated a shock recorder known as the RS two-way ride recorder which measures and records longitudinal impacts and vertical vibration. The impact (longitudinal shock) test determines the ability of the container, interior packaging and the product to withstand shipment and if protection to the product during shipment is adequate. The vibration (vertical shock) test determines the ability of the packaged product to withstand vibrational shock encountered during transportation.

H. G. D. Nutting, president, L.A.B. Corporation, discussed the use of vertical vibrator equipment which simulates the vibration and shocks, movements, pitch and toss of freight cars and motor trucks.

### Carriers offer their cooperation

The program was concluded by talks by men representing three carrier groups, Association of American Railroads, Railway Express Agency, and American Trucking Associations. (The Air Cargo Association has indicated that it will also cooperate with the PEI Packaging and Shipping Committee.)

*H. N. Williams*

"The railroads will take on their full share of this proposed industry-wide research and planning for improvement because they, too, are suffering large avoidable losses in damage claims as well as intangible losses in good will — your good will and that of the shipping public generally," stated A. L. Green, special representative, Freight Claim Division, Association of American Railroads. How-

ever, he pointed out that in some instances damage to porcelain enameled products was found to be due to faulty application of enamel as well as to improperly designed appliances.

### Railroads offer aid in perfecting improved handling methods

Green continued "the railroads can do a better job and want to cooperate to the fullest extent with your committee in perfecting improved methods of handling shipments and cars. A great deal of personnel training and reporting of improper handling to the yard or station responsible is being done. The prevention staffs of many railroads have recently been strengthened.

*A. L. Green*

"The Freight Claim Division . . . has produced a training film, in color, directed to more careful switching of cars. This film is being shown in instruction cars and otherwise to switchmen and roadmen in yards and terminals throughout the country. We think an educational sound slide film showing the great care that must be exercised in the handling of less carload shipments of all enameled products should be produced and used by all railroads in a more effective effort to stop the damage resulting from carelessness and lack of knowledge of the kind of handling that must be given porcelain ware," stated Green.

### More cooperation

"The express agency will cooperate," said A. E. Dowling, Railway Express Agency, who pointed out that the testing equipment will bring out pre-shipment faults thereby reducing losses.

W. L. Yingling, American Trucking Associations, stated "Your industry is to be congratulated upon taking the initiative in establishing this program. True, many manufacturers have designed their products and their packaging to such a degree that damage in transit is held to a minimum; they too are represented here today because they are not satisfied with a situation which produces even a minimum of freight claim experience . . . .

"Opposed to this, many manufacturers have been content to meet the carriers requests for boxes or crates with a package that merely conforms to the dictionary definition for a box or crate but does not afford adequate protection to the contents. Others secure the finest protection that package engineers can design, but due to some peculiarity in the design of their product, damage in transit invariably occurs . . .

"Damage in transit is a matter of paramount concern to the motor carrier. Condition of freight on arrival spells the difference between profit and loss. . . .

"We have found that much damage occurs not on the vehicle while in motion, unless improperly stowed, but instead in the handling — in the loading and unloading. . . .

"The truckman . . . must single handedly unload your shipment from the truck to the sidewalk level. Your packages and your product must be designed to hold up under this hazard. It can be done. It is being done. . . . "

There must be "100% acceptance to the procedure submitted to you today . . . Partial observance will not suffice," concluded Yingling.

## PEI seventeenth annual meeting

FOLLOWING the Sales and Management Conference, the 17th Annual Meeting of the Porcelain Enamel Institute was held Friday morning in the upper tower of Hotel Stevens, with President C. D. Clawson presiding.

After the meeting was called to order, the secretary's report and the treasurer's report were presented. Secretary Edward Mackasek presented figures which showed that the Institute was operating on a very sound financial basis and that it was expanding its activities.

Then followed reports on the progress of the PEI committees, including: Product Standardization Committee, Forum Committee, Market Development Committee, Commercial Research Committee, Institute Development Committee, Sales and Management Conference Committee, Process Development Committee, Packaging and Shipping Committee, and Color Standardization (Signs) Committee.

D. C. MacDonald of Industrial News Service, closed the morning session with a report on PEI publicity during the past year. He stated that at least 70 trade papers carried articles on porcelain enamel during 1948.

At 1:30 p.m., the organization meeting of the Board of Trustees was held and officers for 1949 were elected.

**PEI Officers for 1949**

President: C. D. Clawson, Ferro Enamel Corporation

Vice Presidents:
- Herbert R. Spencer, Erie Enameling Company
- J. H. E. McMillan, Ingram-Richardson Mfg. Co.
- J. T. Penton, California Metal Enameling Co.
- T. G. Harris, Porcelain Steel Corporation

Treasurer: P. B. McBride, Porcelain Metals Corp.

Secretary: Edward Mackasek, Porcelain Enamel Institute

The following divisions of the Porcelain Enamel Institute also met during the two day meeting: Architectural Division, Formed Metal Plumbing Ware Division, Jobbing Division, Sign Division, and Table Top Division.

# Business in air markers

## survey of huge potential market for porcelain enameled air markers throughout the United States

*By Malden Grange Bishop* • FINISH CORRESPONDENT

Exclusive feature finish

The first air marker was a human one. It withstood the ravages of the weather for less than five minutes. It was in a Pennsylvania mountain village back in the 1920's. A pilot was flying an early mail route. He became lost in a snow storm, and his fuel was low. He sighted a village but had no idea where he was. A school teacher, sensing what was wrong, herded her children out in the cold and had them stand so as to spell out the letters of the village. The pilot dipped his wings gratefully and flew on.

The latest air marker is a porcelain enamel marker described in the June, 1948, issue of *finish*. It is a permanent one, and will mark Nappanee, Indiana, to many thousands of Pilots for many years to come.

### CAA campaign for 100,000 air markers

The Civil Aeronautics Administration has launched a campaign for 100,000 air markers, the minimum number deemed necessary for the safety and advancement of private flying. How many of them will be porcelain enameled markers will depend to some extent upon the alertness of enamelers to this potential new business.

The program is under the immediate supervision of Mrs. Blanche Noyes, one of our best known women flyers, who has been preaching and teaching air markings for several years with the Department of Commerce. Mrs. Noyes is asking every community, whether they have an airport or not, to install air markers.

Adequate air marking is an essential part of the 24 Skyways planned for the United States. These Skyways have already been extended across international boundaries. Skyway 51, for example, streaks from Mexico, across the United States, and into Canada.

### Source of funds

Funds for air markers will, in many instances, be paid from Federal programs. In other instances the Federal Government will assist with funds. However, it is the aim of CAA to induce communities to provide their own markings. The Civil Air Patrol, flying clubs, and many other organizations are swinging into the campaign. Enamelers, with an eye to this new business, might well add their own weight in making communities air marker conscious.

Prospects for porcelain enameled air markers are litterally everywhere. Probably the best prospects are the 455 airports which will be constructed or improved in 1949 under CAA's newly-announced program. It calls for 137 completely new airports, and 282 improvement projects. The Federal Government has already provided $35,098,459, and local and state agencies are furnishing $38,720,996 more.

### List of approved projects throughout the country

The following is the list of approved projects:

ALABAMA, $399,388: Municipal at Anniston, Birmingham; Florala-Lockhart, Florala; Elmore Field, Wetumpka; Pryor Field, Decatur; Dannelly Field, Montgomery; Gadsen.

ARIZONA, $429,633: Municipal at Superior, Benson, Duncan, Flagstaff, Globe Miami, Holbrook, Prescott, Tuscon, Yuma, and Clemenceau-Cottonwood, Clemenceau; Eager, Springerville; Clifton Morenci, Clifton; International, Nogales.

ARKANSAS, $429,477: Municipal at Morrilton, Springdale, Jonesboro, El Dorado, Fort Smith, Newport, Stuttgart, and Harrell Field, Camden, Blytheville.

CALIFORNIA, $2,640,551: Municipal at Susanville, Hayward, Santa Monica, Los Angeles, Oakland, Redding, Sacramento, Visalia, Long Beach, San Francisco; and Bieber; Borego Valley, Borego; Humboldt County No. 1, Eureka; Fort Jones; Garberville; Hanford; Hayfork; Lompoc; Pismo Beach; Trinity Center; Tulelake; Imperial County, Imperial; Yuba City; Fontana; Haigh Airport, Orland, San Luis Obispo; Buchanan Field, Concord; Hawthorne; Monterey Peninsula, Monterey; Ventura County, Oxnard; Morrow Field, Rialto; Sonoma County, Santa Rosa; Marysville; Palmdale; Hammer Field, Fresno.

COLORADO, $418,755: Municipal at Grand Junction, Gunnison, Trinidad; and Stapleton Airfield, Denver.

CONNECTICUT, $174,000: New Haven.

DELAWARE, $150,000: New Castle Municipal, Wilmington.

FLORIDA, $729,350: Municipal at Daytona Beach, Tallahassee; and International, Miami.

GEORGIA, $999,950: Municipal, Atlanta; Darien McIntosh, Darien; Muscogee County, Columbus; Souther Field, Americus; Bush Field, Augusta; Calloway Airport, LaGrange.

IDAHO, $110,023: Municipal at Craigmont, Idaho City, Pocatello,

Boise; and U. S. Forest Service, Priest Lake.

ILLINOIS, $3,773,000: Municipal at Cairo, Peoria, Springfield, Chicago; and Orchard, Chicago; Carbondale-Murphysboro; Harrisburg-Raleigh; Logan County, Lincoln; Du Page County, West Chicago; Civic Memorial, Alton; Mattoon, Charleston; Vermillion County, Danville; Williamson County Marion Herrin.

INDIANA, $989,000: Municipal at Gary, Kokomo, Indianapolis, Richmond, Evansville; and Porter County, Valparaiso; Kisters Field, Bloomington; St. Joseph County, South Bend.

IOWA, $836,999: Municipal at Clarinda, Denison, Jefferson, Knoxville, Northwood, Perry, Sheldon, Waverly, Esterville, Boone, Clinton, Fort Dodge, Keokuk, Burlington, Des Moines, Dubuque, Waterloo.

KANSAS, $469,867: Municipal at Horton, Ulysses, Harper, Junction City, Russell, Pittsburg, Topeka, Coffeyville, Liberal, Hutchinson, Wichita; and Osawatomie-Paola, Osawatomie; Garden City.

KENTUCKY, $377,500: Georgetown; Hazard; Williamstown; Owensboro; McCracken County, Paducah; Standiford Field, Louisville.

LOUISIANA, $337,535: Municipal at Homer, Marksville, Lafayette; and Moisant International, New Orleans; Iberia Parish Airport, Iberia; Abbeville; Mandeville.

MARYLAND, $1,095,300: Municipal at Easton, Frederick, Salisbury, and Friendship Church Site, Baltimore.

MASSACHUSETTS, $772,500: Municipal at Pittsfield, Worchester; and Stevens, North Adams; Fall River; Fittsburg.

MICHIGAN, $1,468,700: Municipal at Fremont, Pontiac, Sturgis, Detroit City, Muskegon; and Clinton Woolsey, Northport; City Airport, South Haven; St. Clair County Municipal, Port Huron; Kellogg Field, Battle Creek; Capitol City Airport, Lansing; Wayne County, Detroit; Ironwood.

MINNESOTA, $654,000: Municipal at Glenwood, Grand Marais, Little Falls, Pipestone, Crookston, Detroit Lakes, Fergus Falls, Owatonna, Thief River Falls, Worthington, Mankato, St. Cloud, Winona; and Flying Cloud Airport and Twin Cities at Minneapolis-St. Paul.

MISSISSIPPI, $254,297: Municipal at Brookhaven, Vicksburg, Grenada, Laurel, Gulfport; and Hawkins Field, Jackson; Key Field, Meridian.

MISSOURI, $300,508: Municipal at Albany, Branson, Maryville, Unionville, Excelsior Springs, Kennett, Nevada, St. Joseph; Daviess County, Gallatin; Harris Field, Cape Girardeau.

MONTANA, $114,413: Flathead County, Kalispell; Billings; Lewiston; Miles City; Great Falls.

NEBRASKA, $566,854: Municipal at Bayard, Bloomfield, Burwell, Dunning, Harrison, Pawnee City, Red Cloud, Sargent, Valentine, Wahoo, Wauneta, West Point, Curtis, Minden, Hastings, Kearney, Omaha.

NEVADA, $135,106: Mesquite Bunkerville, Mesquite; Clark County, Las Vegas; Boulder City; Elko.

NEW HAMPSHIRE, $185,635: Municipal at Concord, Berlin, Portsmouth; Boire Field, Nasha; Whitefield Mountain Air Terminal, Whitefield; Manchester.

NEW JERSEY, $600,000: Municipal at Newark, Atlantic City; and NAS, Atlantic City.

NEW MEXICO, $579,195: Municipal at Aztec, Carrizozo, Dexter, Hagerman, Roy, Alamogordo, Clayton, Hot Springs, Santa Fe; and Lea County Airport, Hobbs; Questa.

NEW YORK, $2,917,000: Municipal at Jamestown, Massena, Albany, Buffalo, Plattsburg; and Tri-Cities, Binghampton; Duchess County, Poughkeepsie; Chemung County, Elmira; Oneida County, Utica; Broome County, Binghampton; MacArthur, Islip; Schenectady County, Schenectady; Clarence Hancock, Syracuse; LaGuardia Field and Idlewild, New York; Callicoon; Ellenville; Rochester.

NORTH CAROLINA, $536,026: Municipal at Rocky Mount, Shelby; and Halifax County, Roanoke; Douglas Field, Charlotte; Simmons Knott Airport, New Bern; Smith-Reynolds Airport, Winston-Salem; Bluethenthal, Wilmington; Greensboro-High Point.

NORTH DAKOTA, $29,500: Municipal, Dickinson; Matheny Field, Carrington.

OHIO, $946,500: Municipal at Chardon, Jackson, Salem, Marion, Dayton, Springfield, Youngstown, Zanesville, Cleveland; and Memorial, Akron; Columbus, Port Columbus; Glendale, Toledo.

OKLAHOMA, $699,899: Municipal at Blackwell, Boise City, Bristow; Broken Bow; Buffalo, Chandler, Cherokee, Edmond, Guymon, Hollis, Hooker, Lexington-Purcel, Marietta, Temple, Watonga, Wewoka, Pauls Valley, Ponca City, Lawton, McAlester; and Ardmore-Lake Murray, Ardmore; Lake Carl Blackwell, Stillwell; Searcy Field, Stillwater; Max Westheimer Field, Norman; Seaplane Base, Oklahoma City.

OREGON, $238,000: Municipal at Eugene, North Bend; and McNary Field, Salem; Roberts Field, Redmond; Portland.

PENNSYLVANIA, $2,092,244: Municipal at Eagles Mere, Emlenton, Punxsutawney, Franklin, Bradford, Philadelphia; and Beaver County, Beaver Falls; Memorial, Oil City; Allentown-Bethlehem, Allentown; Altoona Blair City, Martinburg; Port Erie, Erie; State, Harrisburg; Wilkes-Barre-Scranton, Wilkes-Barre.

RHODE ISLAND, $78,492: Block Island.

SOUTH CAROLINA, $263,500: Municipal at Gaffney, Union, Charleston, Winnsboro; and Coronaca Airfield, Greenwood.

SOUTH DAKOTA, $424,399: Municipal at De Smet, Rapid City, Sioux Falls, Watertown.

TENNESSEE, $863,700: Municipal at Brownsville, Cookeville, Lexington, Milan, Columbia, Paris; and Warren County Memorial, McMinnville; International Terminal, Waverly; Tri-Cities, Bristol; Lovell Field, Chattanooga; McGhee Tyson, Knoxville.

TEXAS, $2,803,416: Municipal at Deleon, Muleshoe, Quanah, Seminole, Breckenridge, McCamey, Bay City, Corsicana, Mineral Wells, Texas City, Alice, Brownwood, Palacios, Temple, Big Springs, Houston, Laredo, San Antonio, Sweetwater, Waco; and Jas-

*to Page 54* →

# Development of porcelain enameled

## coatings on metals for Navy shipboard service

*By Forrest R. Nagely and Joseph H. Chilcote*

• PROTECTIVE COATINGS GROUP, RESEARCH & STANDARDS BRANCH, BUREAU OF SHIPS, U. S. NAVY

PORCELAIN enamel coatings can be made seaworthy. Their seaworthiness has proved to be superior for preventing the deterioration of submarine exhaust mufflers. To a similar degree of merit they have also proved seaworthy as material for joiner bulkheads fabricated from steel.

Within the experience of the authors, porcelain enamel on steel was introduced for use aboard Naval vessels by Seaporcel, Inc., presently operating under the name Seaporcel Metals, Inc. . . . This introduction of ceramic coated steel for joiner bulkheads occurred during an era of intensive shipbuilding, when the Navy took over the conversion of several passenger liners into hospital ships and troop carriers.

The properties considered desirable for bulkhead porcelain enamels on steel are described in Bureau of Ships Specification 47S31(INT) dated 1 June 1943 — Steel, Sheet; Coated; Non-metallic Fused Coating (Ceramic). . . . At that time representatives of the industry considered it necessary that rather broad latitude be allowed in design changing to permit enameling. Urgency dictated the freezing of designs, and hence, investigations leading to a more general adoption of porcelain enamels had to be postponed.

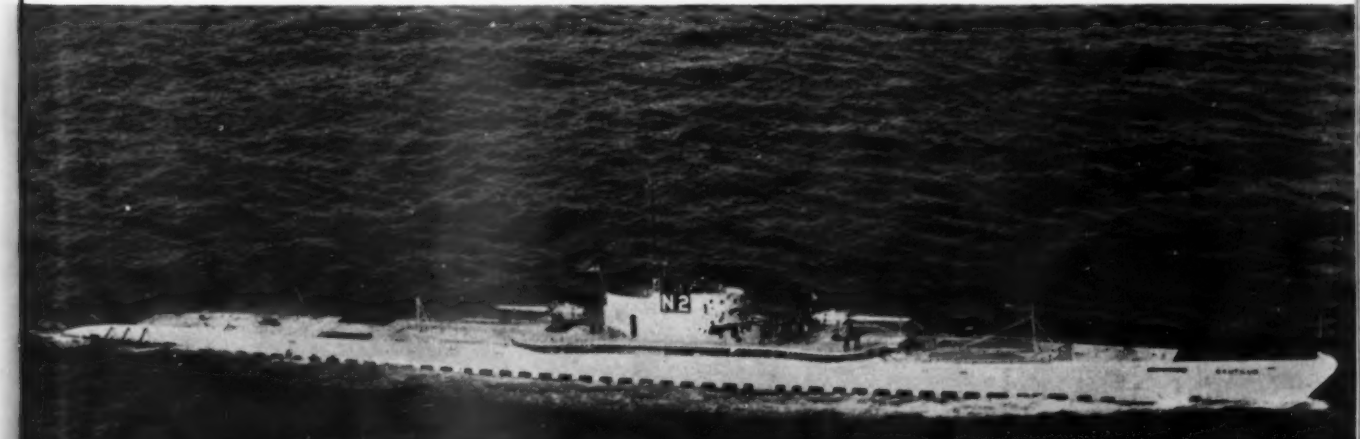
### The practical aspects of applying protective coatings

Today the situation is different with respect to latitude in design. As the development of each shipboard item progresses, new problems arise in the technology of protective coatings. The practical aspects of applying protective coatings remain fundamentally the same. In general, these are: application by shipyard personnel and ships' crews, repairability in place, and inherent resistance to corrosion, shock, and deterioration through aging. Each specific use also dictates particular additional properties of acceptable coatings.

The adoption of porcelain enamel on pressed steel sanitary equipment aboard troop carriers demonstrates the highly practical advantage of this coating in the conversation of critical materials.

Special lines of applied research have been undertaken to develop ceramic coatings for additional shipboard uses other than high-temperature services. These additional uses are frequently discussed with experts in the field of protective coatings and marine corrosion. The technology involved is being studied by designers and builders of ships, and by materials engineers assigned to problems covering the repair and maintenance of not only the hulls and

*One development of protective coatings for ships is the use of porcelain enameled exhaust mufflers for submarines.*



structural members of ships, but also the low temperature components of machinery for propulsion, operational control, damage control including saltwater piping, communication and other signal devices, and auxiliary machinery. These shipboard uses represent considerable diversity in service conditions, methods of applying the coatings, and accessibility for initial installation and for repair.

When vitreous coatings are discussed it is not unusual for the questoin to be asked, "What do you do when it cracks?" or "Doesn't porcelain enamel break off?" The protective coating engineer, being confronted with the detailed analyses of expected service conditions, could be overwhelmed by the complexity of the question, and persuaded to join others in asking, "What does happen when a porcelain enamel coating fails?" Probably the present limited use of ceramic materials as corrosion protective coatings aboard ocean-going vessels is attributable in part to an incomplete understanding of what does happen after a porcelain enamel coating has been damaged. Attempts to answer the question suggest research and development problems galore, and on several different levels of technology, application, administration, and commercial interest. But failure to answer the questions about the mechanisms of coating failures is not the only reason for restricted use. The inherent properties of porcelain enamels as they are popularly understood, in comparison with acceptable coatings, also comprise serious limitations on the practical adaptability of vitreous materials.

Porcelain enamels require application by heat. The marine coating engineer reasons that, unlike paint which can be applied locally, and economically over relatively large surfaces, porcelain enamels in their present state of development have to be applied where the necessary furnaces are available. What can be done to render such coatings applicable locally?

### Porcelain enameled mufflers

The successful use of porcelain on the mufflers serves as a stimulus to engineers to re-evaluate the merits and limitations of porcelain enamels in general and, by means of experimental programs, determine whether or not these limitations need to remain as obstacles in the pathway of more general adoption of this material. Results of experiments which have been recently completed appear to indicate a clearer picture of the technology involved, and afford an additional stimulus and challenge to creative-minded engineers to suggest means for overcoming the existing limitations.

### Oceanographic conditions

Since shortly before V-J Day, attention has been focused upon peculiar limitations of several commonly used coatings which, upon aging, act as water retaining agents. The oceanographic conditions which disclosed the critical significance of this particular deficiency, characteristic of several organic coatings and the corrosion products of metallic coatings, appears to dictate the necessity of glazed (or vitreous) surfaces, and a coating material not subject to internal deterioration so as to render the otherwise protective material operable as a semi-permeable membrane of water absorber. The authors do not regard the matter of glazed (or glassy) surface with a high degree of significance in view of the expected short duration of gloss due to chemical etching by the action of seawater (salt encrustation remaining after evaporation of sea spray). In the case of exterior hull surfaces below the waterline, we would expect the gloss to be destroyed by the attachment of marine organisms. Until vitreous materials can be formulated so as to be antifouling in character, they offer little promise as external protective coatings for ships' hulls below the waterline. Concurrent with the development of materials, equipment, and processes for local application of enamel coatings, formulations to include a leachable toxic agent might well be investigated also. However, the inherent ability of porcelain enamels to remain impervious to seawater, and in the case of exterior topside hull and inboard surfaces to retain a glossy luster, further justify a critical review of the reasons for previously rejecting enamel coatings. Reference to glazed surfaces for exterior topside hull applications is regarded by the authors to be of considerable significance in view of the camouflage requirements involved.

### Study of "jewelers" enamels

Systematic review and exploratory study of "jewelers" enamels have been suggested in connection with anti-fouling surfaces of saltwater piping systems. The few porcelain enamels which have been tested for this use have been found to offer promise in protecting the inside surfaces of copper-base alloy tubing against the turbulent action of seawater flowing at relatively high velocities. Already, the way has been indicated for the use of saltwater piping systems of smaller size tubing, thereby promising a saving in space, weight, and initial cost.

For service classification purposes, the authors consider this use of porcelain enamel to be characterized by the following: (a) applicability (or fit) of a non-decorative porcelain enamel coating to the inside surface of a tubular section, subject to internal pressure, (b) ability of the coating to withstand the erosive (or cavitation) action of high velocity seawater, (c) ability of the coating to withstand the thermal cycle encountered in brazing at the joints, also to have considerable resistance to the chemical attack of brazing fluxes, (d) ability to withstand cold deformation due to "working" of the hull due to heavy seas and ship's gunfire, (e) ability to withstand impact due to accidental blows during construction and alterations, and due to ship's gunfire, (f) applicability of porcelain enamel to a metal, other than steel, which is not expected to corrode at a discontinuity in the coating. This last characteristic becomes highly significant when giving consideration to shipboard use of porcelain enamel on the inside surfaces of steel tubing for saltwater service.

Porcelain enamels, unlike hot-dip galvanized zinc coatings, are not customarily regarded as affording anodic protection to the basis metal

*A total of 136,000 square feet of "porcelain for the sea" was used in divisional bulkheads, ships officers and crews quarters, medical offices, attendants' offices, hospital and operating rooms, patients' quarters and wards of the "Marigold", U. S. Hospital Ship.*

which they cover. Data relative to the condition of steel exhaust mufflers after lengthy periods of sea duty have been insufficient for indicating the chemical nature of the corrosion process where a discontinuity of the enamel occurs. Various exhibitors of such coatings have claimed that corrosion protection is afforded by a layer of iron-silicon alloy beneath the ceramic. Doubtless the results of a systematic investigation of the corroding processes at a penetrable discontinuity in porcelain enamel on steel would aid in developing formulas intended to give maximum corrosion protection with minimum weight of coating and minimum tendency for crack propagation after failure has occurred. For example, it seems possible that a clearer understanding of the function of mill additions or frit ingredients intend to enhance bonding to the basis metal would contribute significantly, not only to knowledge of the corroding action, but also to the development of application processes other than ordinary furnace firing.

Repairability in place is one of the primary requisites of any and all coatings which have been adopted for general shipboard use. Zinc coatings, for example, are repairable in place by spray metallizing, brush electroplating and the use of certain compounds in convenient form which deposit metallic zinc-alloy coatings. We understand that a considerable amount of experimental flame spraying has been tried in several laboratories throughout the enameling trade, and that the results of such work have not been published. We are familiar with certain preliminary experimentation which has been performed with spraying methods intended for the repair of ceramic coatings. Initial attempts to use conventional flame spraying equipment were not completely successful, but disclosed the nature of the deficiencies encountered. There are being studied and procedures, intended to be corrective, are being suggested by the authors.

**Flame spray process**

During the flame spray process, ceramic particles, unlike malleable metallic particles, are shatterable unless heated above their softening point. A spray metallizing operator can deposit a metallic coating on organic materials including wood, cloth, plastics, and paper. Experiments to date have indicated the necessity for preheating the basis metal to a dull cherry red in order to get effective bonding. Also the experiments have indicated the necessity for considerable heating of the ceramic particles being sprayed.

**Equipment—and sprayable ceramics**

The design features of equipment currently classified as powder-type, spray metallizing outfits appear to dictate essential characteristics of sprayable ceramics, such as particle size, frit and enamel composition, shape of particles, and rate of feeding of the ceramic powders. Uniformity of particle size is essential when certain types of powder containers are used. Possibly further experiments will disclose the influence of particle shape (acicular or

*to Page 48* →

# SNAPSHOTS FRO

*Left row, top to bottom: 1. G. A. Foehse, Nesco; Jack Trees, Apex; J. N. Porter, Drakenfeld; Lyman S. Harwood, Harrison Radiator Div. of General Motors.—2. Don Goetchius, Ferro, and Harold Wilson, Vitreous Steel.—3. D. P. Wheeler and Dr. R. W. Brickenkamp, both of Titanium Div. of Nat'l Lead.—4. Dr. Paul A. Huppert; E. C. Dexheimer and G. A. Foehse, of Nesco; Wm. Donaldson, Chicago Vit; Karl Kautz, Climax Molybdenum; Mel Gibbs, American Stove; T. W. Fenton, General Steel Wares (Canada); Walter Fenton, Metalloy.*

*Bottom: Joe Baker, Int'l Harvester; Frank Gibson, Baltimore Po.celain; J. P. Juncker, Servel.*

# ROM THE PEI FORUM

*Right row, top to bottom: 1. A. O. Smith Corp.'s George Zink, Waldo Higgins and Forrest Nelson. — 2. Charles Pearce, American Ceramic Society. — 3. R. S. Sheldon, Frigidaire; A. L. Kreuer, Orefraction; R. S. Van Tassel, Kohler Co. — 4. Arol Hall, Globe American; S. Trayers, Norge, R. S. Goldthwaite and W. F. Gernentz, of Rutenber Electric; Dale Snethen, Globe American.*

*Bottom: Canadian foursome—Robert H. Greene and Frank Menzies, both of General Electric (Toronto); Jim Hossack, Ferro Enamel (Oakville); Mike Regan, Stamped & Enameled Ware (Hespeler).*

**finishfotos**

# Many Porcelain Enamelers Prefer

**TREOPAX Z**
**TREOPAX S**
**TREOPAX**
**for**

# Color Stability
# Scratch Resistance
# Opacity
# Enamel Working Properties

The experience of users is a good yardstick for determining the worth of a product. Our Field Engineers report the following summarized statements from Superintendents in the Porcelain Enamel Industry:

**TREOPAX Z** "Very pleased with results...standardizing 100% on Z."

**TREOPAX S** "Doing a beautiful job on table tops and sinks."

**TREOPAX Z** "All white now being opacified with Z."

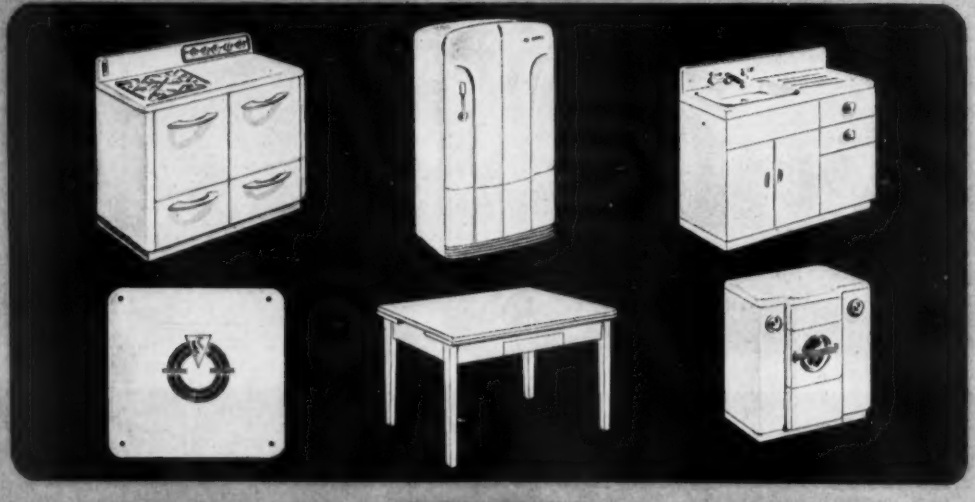
**TREOPAX** "Rates as the best opacifier made."

**TREOPAX Z** "Our standard opacifier in steel enamel."

**TREOPAX Z** "Giving excellent results in zircon enamel."

**TREOPAX** "Use being continued in cast iron and antimony AR."

Our field engineers are well equipped to discuss your problems. They can support their recommendations by laboratory data and by practical experience with shop conditions.



**TAM**

**TITANIUM ALLOY MANUFACTURING COMPANY**

EXECUTIVE AND SALES OFFICES 111 BROADWAY, NEW YORK CITY
GENERAL OFFICES AND WORKS NIAGARA FALLS, NEW YORK

# Giant porcelain enameled sign

## advertises paint, roofing and linoleum

*By Elsa Gidlow* • FINISH CORRESPONDENT

MAGNITUDE is familiar in reports from California and magnitude figures in the facts about the latest porcelain enamel sign to be put up in the San Francisco Bay area. One of the largest of its type in this region, the new illuminated advertisement was erected on the East Shore Highway in Emeryville, across the Bay from San Francisco, to announce the products and trade name of The Paraffine Companies, Inc.

Sixty feet in height and 150 feet wide, the block-type letters are 16 feet tall and illuminated by zeon high intensity tubes. The three tiers of letters feature "Paint", "Roofing", "Linoleum", flashing in sequence, while the brand name "Pabco" remains constant and can be read from San Francisco. A steel framework 48 feet tall and 150 feet wide supports the sign face. The letters used more than 2000 square feet of porcelain enameled steel; 1300 lineal feet of fluorescent tubing are incorporated in the display.

The "Pabco" trade mark, in 16-foot letters, is a brilliant cerise; the other letters are 10 feet high and 8-inches wide, yellow-colored for day effect. The 10,000 watts per hour of electricity consumed by the sign travel four miles of wiring and are supplied by The Paraffine Companies' own power plant.

Situated near the eastern end of the San Francisco Bay Bridge, the flashing words can be seen for many miles around the large bay, but the salt winds sweeping across it from the Pacific Ocean will have no corroding effect on the porcelain face. Many years of experience with signs in this region, where the ocean winds, moist fog and brilliant sunlight soon fade and disintegrate other materials, have proved over and over again that porcelain enameled steel is the most enduring material, as well as efficient in achieving night and day visibility because of its highly reflective surface.

Lloyd L. Harris, of the company's public relations department, said that no unusual difficulties were experienced in the construction and installation of the sign for which the framework alone weighs about 25 tons.

The framework was constructed by Leland S. Rosener Co., and the sign by The Electrical Products Company in San Francisco.

## P.E.I. "safe transit" program given industry-wide endorsement

*(Continued from Page 23)*

& Heating Appliance Manufacturers.

Maurice R. Ely, executive secretary, National Electric Sign Association.

Prof. F. A. Petersen, Enameled Utensil Manufacturers Council.

E. H. Shands, chairman, technical planning division, Porcelain Enamel Institute.

The complete program will now be presented to the individual membership of the various organizations for consideration and approval by the association representatives.

### Carrier representatives speak

Albert L. Green, special representative of the Association of American Railroads enthusiastically offered the program the unqualified support of his organization. He stated that his statistics showed that railroad losses on the shipment of home appliances and fixtures during the first six months of 1948 averaged 75% or more above last year's figures for a like period. "The railroads want to cooperate to the fullest extent with the Packaging and Shipping Committee in improving methods of handling shipments and cars," Green said. Sanctioning the Committee's progress to date, he commented, "If we make this the team-up-together product of all those having a hand in manufacturing and shipping porcelain enameled products, the damage prevention program recommended by the Committee will shoot along like the latest streamliner. No one on the Committee doubts that it will be successful."

### Carriers reaffirm support, desirability of prompt action

Parallel statements by A. E. Dowling, Rail Express Agency representative, and W. L. Yingling, of American Trucking Associations, reaffirmed their enthusiastic support and the desirability of prompt action. Dowling reminded the manufacturers that "No one gains from claims! If there is anything that we can do for you, ask us, and we will see that you get the fullest cooperation." Yingling congratulated the industry on its initiative in establishing the program and remarked that his group was "vitally interested" in its success. "You will appreciate the motor carrier's interest when you stop to consider that practically every shipment you make begins its journey on a truck or completes its journey on a truck," he continued. "Entirely aside from the monetary loss involved, claims for damage involve another loss which is of even greater importance to the carrier. That is the loss of the shipper's good will. Just as you value the good will of your customer, so does the carrier wish to keep the shipper-carrier-consignee relationship at its highest level."

### National interest already gained

Symptomatic of the success which the program is achieving were reports from R. F. Bisbee, chairman of the Packaging & Shipping Committee, and E. H. Shands, chairman of the Technical Planning Division, to the effect that the Porcelain Enamel Institute has been unable to handle the enormous volume of inquiries received from industries not even connected with porcelain enameling. Edward Mackasek, PEI managing director, stated that, in his belief, this was the first time in history that a simple and complete program for the control of shipping damage had been devised and fully accepted by the three largest carrier associations.

**"The boys in the mailing department are betting you wear a wig. Is it or ain't it?"**

# 2 WAYS TO APPROACH A COLOR PROBLEM

## WORK UNTIL YOU'RE BLUE IN THE FACE OR ASK *Drakenfeld* TO HELP

WORKING yourself blue in the face on a color problem means that other important jobs remain undone. So why not do what many other porcelain enamel manufacturers do? They call on Drakenfeld to prescribe a remedy for their "color headaches."

They know that our research facilities and technologists are ready to help solve color problems. They know we are specialists in producing colors to meet the specific needs of their standards and production methods. They find that our many years of research and our broad knowledge of producing porcelain enamel products comes in mighty handy in formulating colors to their utmost rigid specifications.

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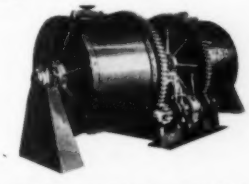
**DEPENDABLE SERVICE ON:** Oxide Colors . . . Screening Paste . . . Graining Colors . . . Squeegee Oils and Mediums . . . Rotospray Sifters . . . Steveco Grinding Mills . . . Porcelain Grinding Balls . . . Porcelain Mill Linings.

**Rotospray — a millroom must!**

The Rotospray helps you get properly prepared slip for the production line. Indispensable for "reconditioning" enamel slip. Equally valuable at ground coat dip tanks. Ideal for any job that requires speedy, positive sieving. Strains through a long-life vertical screen—no clogging. Standard and Junior sizes. Capacities range from 300 to 1,000 G.P.H., depending on nature and specific gravity of product, screen mesh and sifter size. Write for descriptive folder.

**5 SAVINGS WITH STEVECO MILLS**

**Time**
**Labor**
**Horsepower**
**Floor Space**
**Initial Costs**



Steveco high-efficiency duplex mills wet-grind porcelain enamel materials faster, better and at low cost. Many outstanding construction features proved in hard day-after-day service in many plants. Wide range of sizes and linings with all types of drives. Write for catalog, then let us study your grinding needs and recommend the correct type for your requirements.

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You give your customers just double the reasons for preferring your products when you back up the quality symbol of the Porcelain Enamel Institute with the famous U·S·S VITRENAMEL Label. Together they stand for the world's finest finish—a finish that is both durable and beautiful.

U·S·S VITRENAMEL sheets are produced to the exacting requirements of the porcelain enamel industry. Possessing all the qualities that add to the strength, durability and appearance of the finished product, they provide a tenacious bond with the vitreous coating that completely protects both surfaces of the sheet from corrosion, and minimizes the danger of chipping. Thus, you get a porcelain enamel finish of greater beauty and serviceability.

For detailed information concerning the application of porcelain enamel on a VITRENAMEL base, and the added sales value that results from showing the familiar U·S·S Label on your products, write to United States Steel, 2030 Carnegie Building, Pittsburgh 30, Pennsylvania.

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**VITRENAMEL**

**UNITED STATES STEEL**

# Pacific Coast enamelers

## discuss four major groups of standards

*By Malden Grange Bishop* • FINISH CORRESPONDENT

AFTER a discussion and the appointment of committees for the big Christmas Party, and handing the entertainment committee $150 to spend for fun for the evening, 62 members of the Pacific Coast Enamelers Club leaned back in their chairs to digest their steaks and to hear Russell Greer, vice president in charge of sales, Pemco Corporation, talk easily about plant control.

Introduced by President A. G. Sattler (U.S. Porcelain), Greer made it clear that he was talking only about the kinds of controls which enamelers could apply for themselves effectively.

### We must protect it

The porcelain enameling industry, Greer said, has one of the best finishes on the market, but it is up to enamelers to protect it. Protecting the present quality of porcelain enamel—which has come a long way in the last few years—as we continue to improve it was a matter of establishing adequate controls of all plant operations.

"We are going back to a buyer's market," he pointed out. "We must prepare for that time. We must produce products of such high and pleasing qualities that the products themselves will bring us repeat business."

Controls in an enameling plant are merely a matter of setting standards. Standards must be kept simple, understandable and workable. We can be neither too lax, nor too technical in our standards.

There are four major groups of standards: (1) controls in selling, (2) controls in raw materials, (3) controls in process, and (4) controls in products.

### Selling controls

Controls in selling, which too often are not considered, are highly important. Although porcelain enamel is the finest finish in the world, it has its limitations and we must not over-sell it. "Sometimes we have to turn down business. We have to turn it down when porcelain enamel is not the best finish for a particular item."

"Ask that three letter question when you're selling porcelain enamel as a finish," Greer suggested. "Ask 'Why?' Ask your customer and yourself why porcelain enamel should be used on this particular product. And before you say that it is the best finish, experiment with the item and prove that it is the best finish."

The entire porcelain enameling industry is hurt when we over-sell. A big scrap pile doesn't do anyone any good. If we can't do the job better than any other finish and finishers then we should not sell it.

Greer illustrated this point by relating an incident in 1928, when orders were hard to find, where his company advised a refrigerator manufacturer *not* to use porcelain enamel on a newly designed refrigerator. The new product had not been engineered so that it could be successfully enameled.

### Raw materials control

Control in raw materials is another oft-neglected phase. "We are frit manufacturers," Greer stated. "We make the best product we know how. We have standards and we inspect each bag of frit. The inspector stamps his approval on the bag and it goes to you.

"But there is no reason in the world," Greer warned, "why you should blindly accept our word for it. We make mistakes. The inspector could be wrong. You should test each bag of frit by our own standards. You are the one who must control what goes into your finished product."

### Process control

Control of process means that careful control must be exercised from fabrication to finished product. "The part must be designed right for porcelain enameling. Our processing begins with the engineers."

Too often we feel that because we have continuous line processing we need less control. "The truth is," Greer pointed out, "we need more control *because* we do have long conveyor lines. Losing time on a conveyor line is extremely expensive."

*Left to right: Harry Ingersoll and Russell Greer, both of Pemco, discuss business trends with Roy W. Armour, of Chem. Pro. & Engr. Co.*

Costly installations of mechanical equipment to handle products is foolish if we do not exercise the closest possible control over the processing done by the equipment. Greer recalled one enameler who was proudly displaying blueprints for a $55,000 conveyor system for his pickling process. "Yet when we walked out into the plant," Greer shuddered, "he told me that the pickling tank had not been emptied for six months."

### Finished product control

Control of the finished product is another control too often slighted by

*to Page 54* →

# More new members

Each month finds more new names on the P.E.I. roster—names of companies representing *leadership* in their respective fields. These companies will all receive a valuable return in technical, practical and sales assistance through P.E.I. services and each in turn will add new strength to an already alert and strong cooperative organization.

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## PORCELAIN ENAMEL INSTITUTE, INC.

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## Application of cover coat enamel directly to steel

*(Continued from Page 26)*

stainless quality and, in addition, had the highest scratch resistance of any enamel yet seen.

This enamel was found to produce excellent bond when sprayed directly on titanium bearing steel. The greatest objection found was that it required a high firing temperature to mature it to a satisfactory finish and to produce a good bond. This was also found to be true when zirconium enamel was applied directly to titanium bearing steel. Approximately 40 degrees higher firing temperature was required to mature an enamel sprayed directly on the steel as then would be required to mature the same enamel over a ground coat. Since that time, titanium bearing enamels have been developed that will mature at a substantially lower temperature when applied directly to steel without impairing any of their good qualities.

One of the chief objections to the use of titanium bearing enamel at the beginning was its yellowish-green color, which was definitely objectionable. It was found that certain coloring oxides could be used in the mill that would correct this color. Many of these enamels, however, did not stand refiring without a change in color. We have found by two years experience in using this enamel over ground coat that a uniform color can be maintained even in re-coat work without the use of a color stabilizing coat for re-work. From the standpoint of operational cost, this fact alone is most meritorious.

### At last – the all white range top

The all white gas range top has been for many years something that gas range manufacturers had desired and had made many attempts which almost invariably had ended in failure. A test of a section immediately adjoining the burner on a gas range, where titanium white enamel was applied directly to titanium bearing steel, showed that no breakage occurred, regardless of the severity of this test. Further tests of this part under actual working conditions did not show damage. Later in the test, however, a slight discoloration appeared adjacent to the burner which was later found to be caused by tiny crazings too small to be detected with the natural eye. Further tests were run using titanium bearing cover coats over titanium bearing steel, but in this case a very light ground coat was used. This proved to eliminate the discoloration. Since that time, all Roper ranges have carried the all white top, and our experience over the past two years has been good. This constituted our first successful all white gas range top.

Tests are currently being run in our enamel plant toward the universal practice of running all range tops with titanium bearing enamel sprayed directly to titanium bearing steel. In order to create the minimum of confusion and losses, we have started by running five tops per day, analyzing our rejects and working toward their corrections. Sufficient progress has been made to enable us to raise our daily production to twenty-five per day, and our records show that we are able to get an average yield in two fires of 90%, which represents a 15% better yield than we are able to get today using the conventional ground coat and conventional steel.

### Progressive production is earnestly suggested

The practice of entering into this process in a small way is highly advisable. While this is, no doubt, the greatest step that has been made in the enamel industry in the last thirty years, it does present serious problems in application and control. Automatic spraying is highly desirable in that it gives a more even coating. Where automatic spraying is done, a spray booth twice the size of an ordinary spray booth is required since, in order to get production, the part must be sprayed on the back which requires an automatic spray and two edging booths, an area for turning the parts, and a second automatic spray and edging booths. The management of our company was so convinced that enamel could be applied successfully directly to steel that they invested in a spray booth of the required type for this particular job. It is evident that on continuous spray lines where only one set of spray booths are used, the parts must go through the conveyor and be sprayed on the back, and then be returned to be sprayed on the top surface. This is obviously impractical.

### Strict control of pickle room is necessary

It is also highly necessary to have the pickle room under strict control, particularly on the question of timing. I would not say that a continuous pickling machine is absolutely necessary for this type of work, but it is easier to control from the standpoint of timing in the various solutions.

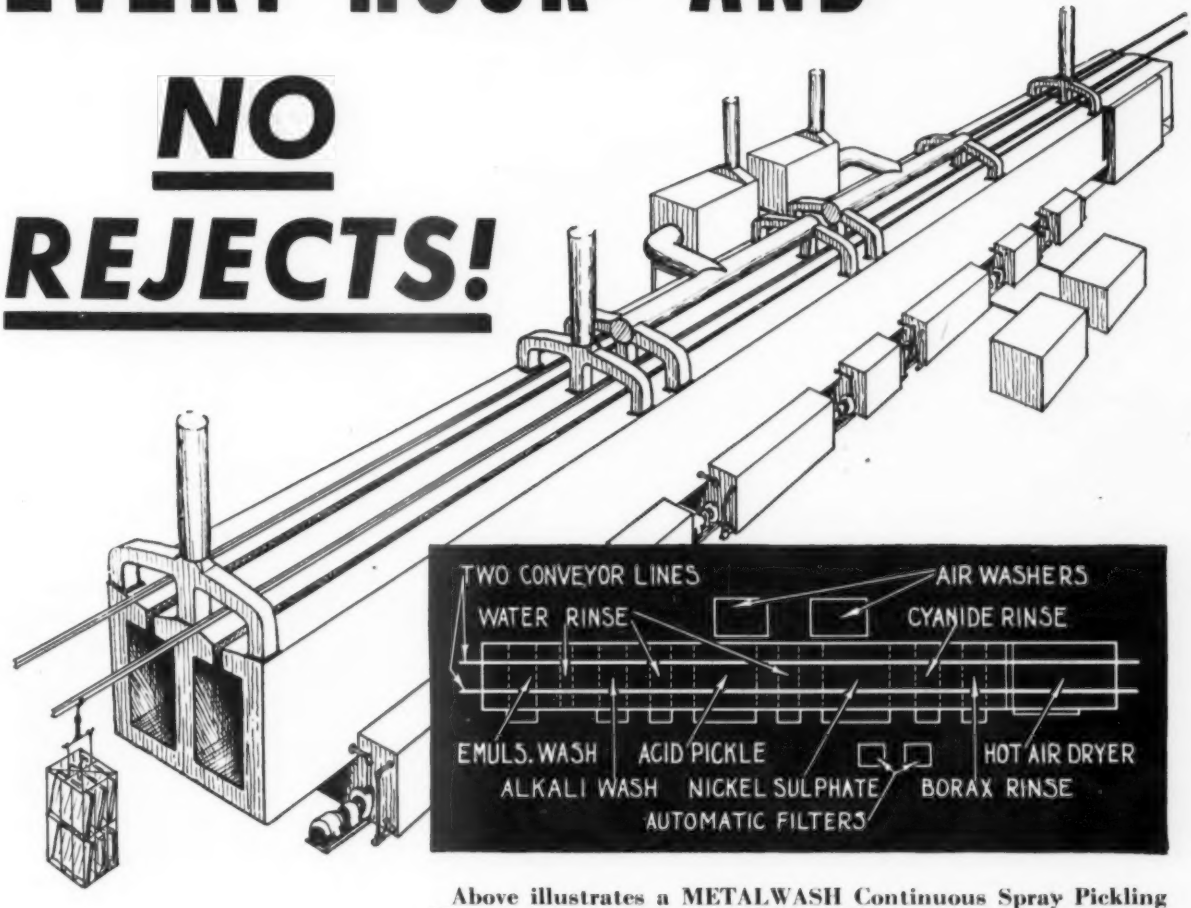
The firing of the parts offers no particular problem except for the fact that the parts are sprayed both front and back, and for that reason naturally require more care in handling. The exposed flanges, edges, etc., must be protected since if the enamel is scratched from any surface it naturally goes without protection and is subject to rusting. When exposed on the product, this also is unsightly and not acceptable.

### Process can be mastered

While this is a process offering many problems from the standpoint of application, it is certainly not one that cannot be mastered. The practice of entering into this process in a small way and increasing the production as experience is gained is highly recommended. Entering into full production without previously gaining experience could easily result in disaster and give this process a bad reputation. Once this process is developed and the manufacturer of an enameled product is assured as his mounting and field losses are brought down to a point that is almost negligible, this manufacturer would, no doubt, feel that the time spent in gaining experience in this process was time well spent.

# PICKLING 150 RANGES EVERY HOUR—AND

# NO REJECTS!




**Above illustrates a METALWASH Continuous Spray Pickling Machine operating in a plant of a leading manufacturer of kitchen ranges. This machine automatically cleans and pickles 150 steel ranges per hour, prior to porcelain enameling.**

**This equipment has meant the practical elimination of rejects due to improper cleaning and pickling. Although the time required for the complete operation shown on the diagram is much shorter than that required by immersion cleaning methods, results are far superior. The operation is automatically controlled, and cleaning, etching and nickel coating are entirely uniform. Further, the ware does not dry between the various treatments. Less solution is required for each stage because the mechanical action of the sprays greatly increases the effectiveness — and all obnoxious fumes are vented through air washers.**

**METALWASH *engineered* continuous spray pickling equipment can give you better cleaning and pickling prior to porcelain enameling. Write today for further information.**

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## Development of porcelain enameled coatings on metals for Navy shipboard service

*(Continued from Page 35)*

round-edge) on the flow characteristics of powder through the spraying equipment. Possibly the differences in particle shape attributable to the milling process, whether dry milled or wet milled and dried, should be studied in considerable detail. When depositing metallic coatings by spraying, a greater control in the uniformity of feeding is obtained by the use of wire type equipment than with powder type. Therefore the authors take this opportunity of suggesting the investigative development of equipment and materials intended for a flame spray coating procedure, utilizing ceramic enamels in rod form or a metallic wire heavily coated with porcelain.

Flame sprayed ceramics are considered more readily bonded to surfaces previously covered with a base coat applied by conventional firing methods. The influence of surface tension and viscosity characteristics of the molten ceramic take on added significance in this spray method of coating. A limited number of observations indicate that powdered iron added to the ceramic mix might be effective in breaking the surface tension such as causes "balling-up" of the molten enamel on hot metal.

### Preheating of basis metal previously enameled

Satisfactory preheating of basis metal previously enameled, and from which the porcelain had been partially removed by spalling, has been accomplished on an experimental basis for re-coating by the flame spray process. The test indicated that it is absolutely necessary to control the heat distribution around the area being coated. If the temperature gradient is too steep, upsetting of the metal and consequent cracking (or crazing) of the enamel results. Satisfactory recoating was accomplished only with carefully controlled heating torches, and on a simple cylindrical steel surface. The method appears to be impractical for repairing damaged coatings on or in the vicinity of surfaces such as in the dihedral angle of a welded assembly, where localized heating would cause irregular distribution of expansion and consequent cracking of the less-flexible porcelain.

### Flame spray results

Results of experiments with flame spray enameling of metals appear to indicate that two general types of coating procedures warrant investigation. One of these comprises the use of readily diffusible frits so formulated, and of such consistency that the *maturing time is of minimum duration.* The other comprises the use exothermally reacting mixtures of such formulation that oxides, borides, or silicates are formed and the heat of reaction (plus the ignition energy supplied by the flame spraying device) will be sufficient to fuse the particles but under conditions such that the heat effect will have minimum influence on the basis metal and surrounding coating, and not cause upsetting and cracking.

Should these experiments be conducted and the results be satisfactory, the gateway to a new field in ceramic coating research is opened to investigators intrigued by the possibility of synthesizing enameling materials "in situ" on the basis of thermo-dynamic properties of the raw materials. For example: Alumina ($Al_2O_3$) is "added" to (formed in) the coating by the use of powdered aluminum and some particular oxide, the heat of formation of which is less than that of alumina. Silica ($SiO_2$) or some particular silicate may be "added" by the use of a metallic silicide and some oxide, the heat of formation of which is less than that of silica. Titania ($TiO_2$) also has a relatively high heat of formation and is not to be overlooked when experimenting with exothermally reacting mixtures. The use of powdered titanium metal or ferro-titanium is suggested.

Since cobalt oxide is generally considered essential to satisfactory bonding on steel, we propose the "addition" of this element by using cobalt silicide as an ingredient in the reacting mixtures. The anhydrides, ($B_2O_3$) of boric acid and ($C_rO_3$) of chromic acid are relatively low in heat of formation, and were suggested as ingredients in mixtures known to react readily, and supposedly to form borides of chromium compounds.

Coatings deposited from mixtures of powdered aluminum, chromic acid, and boric acid have been observed to be reactive. The coatings resulting therefrom are not glassy, and have a burnt appearance. Adhesion has been poor. But the corrosion resistance, as indicated by acid spot testing appears to offer considerable promise. Experiments are being planned with modified mixtures intended to produce, as reaction products, bonding-glass substances customarily expected to form good ceramic coatings, in addition to elements or compounds introduced to impart some specific property to the coating.

### More extensive use of porcelain enamel seen for Naval vessels

Although considerable investigative work remains to be done in the field of flame spraying equipment, application techniques, and formulation of enamels intended to correct certain readily observable deficiencies, there also remains the general problem of studying the properties of sprayed coatings and engineering problems in their application before the flame spray deposition of ceramic coatings can be accepted as standard procedure. If satisfactory ceramic coatings can be deposited by flame spray processes on metal surfaces, either for purposes of initial application or repair of defects resulting from accidents in service, it is believed that porcelain enamel could be more universally used aboard Naval vessels.

Also it appears desirable for any repair coating material to have the lowest practicable melting (or softening) point; in order that any internal stresses due to variance with the thermal coefficient of expansion, will have the least deleterious effect on the elastic properties of the coating. The field of flame-sprayed, low-maturing-

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temperature ceramic coatings appears to be wide open to investigators willing to undertake the experimental effort.

### Possible use in electrical contactor equipment

One possible immediate use of such material might be in the fabrication of parts for electrical contactor equipments. At present this equipment is made from molded ceramic bodies or plastics. The former has the disadvantage of relatively low resistance to shock and impact. The latter is susceptible to deterioration through arcing at sliding contact points. Initially the arcing is very slight; but through repeated opening and closing of circuits, the surface of the plastic becomes charred. Of course the application of a ceramic coating to a plastic surface is impossible with enamels whose maturing temperatures are above the maximum temperature to which the plastic may be safely heated. However, the development of a low-temperature ceramic which could be applied by a flame spray process might offer a satisfactory solution to this switchgear problem involving the deterioration of dielectric bodies in the vicinity of contactor areas.

### Shipboard service classification

It is highly desirable for all coatings to have the highest practicable degree of elasticity, not only at the temperatures encountered in the cooling cycle, but also at the temperatures, and under the thermal stressing, encountered under service conditions. Considering the elasticity of coatings, the authors propose further classification of shipboard services which, for convenience, we illustrate by the exhaust piping system of a submarine. These classifications are characterized by: (1) cylindrical steel surfaces coated on both sides, and not subject to deformation due to differences between internal and external pressures, (2) cylindrical steel surfaces coated inside only and subject to cold deformation in compression due to external hydrostatic pressure, and (3) cylindrical surfaces coated inside only and subject to cold deformation in compression due to external hydrostatic pressure and simultaneously subjected to deformations, such as in an expansion joint, due to temperature differences within the exhaust system.

The inherent quality of ceramic coatings to resist dissolving action in seawater in combination with other corroding media encountered in shipboard service is not to be overlooked among the other essential requisites of satisfactory coatings. In the case of submarine mufflers, the corroding agent is a mixture of exhaust gases and seawater. This mixture appears to be unique in regard to its corrosive attack on metals. By analogy, it seems reasonable to expect similar enamel coatings to be serviceable where the corroding medium is a mixture of sulfur-laden combustion products and marine atmospheric moisture, such as encountered by masts, topside radio and radar equipment, smoke funnels, and other rigging exposed to stack gases, the condensation products of which are particularly corrosive. Porcelain enamel has also been considered for use in battery room spaces where acid vapors and condensates therefrom are quite corrosive.

The porcelain enamel coatings which have been utilized thus far for shipboard service have been applied to parts delivered to some job enameling firm. The development of materials for such coatings which can be applied in shipyards and aboard ship would be highly conducive to a more general adoption of seaworthy porcelain enamels. Considering the probable increased quantities of parts of various marine equipments which, for initial application of coatings, could be submitted to commercial job enamelers, such as presently established for serving industry, the position of such firms would certainly not be jeopardized by the foregoing suggested developments.

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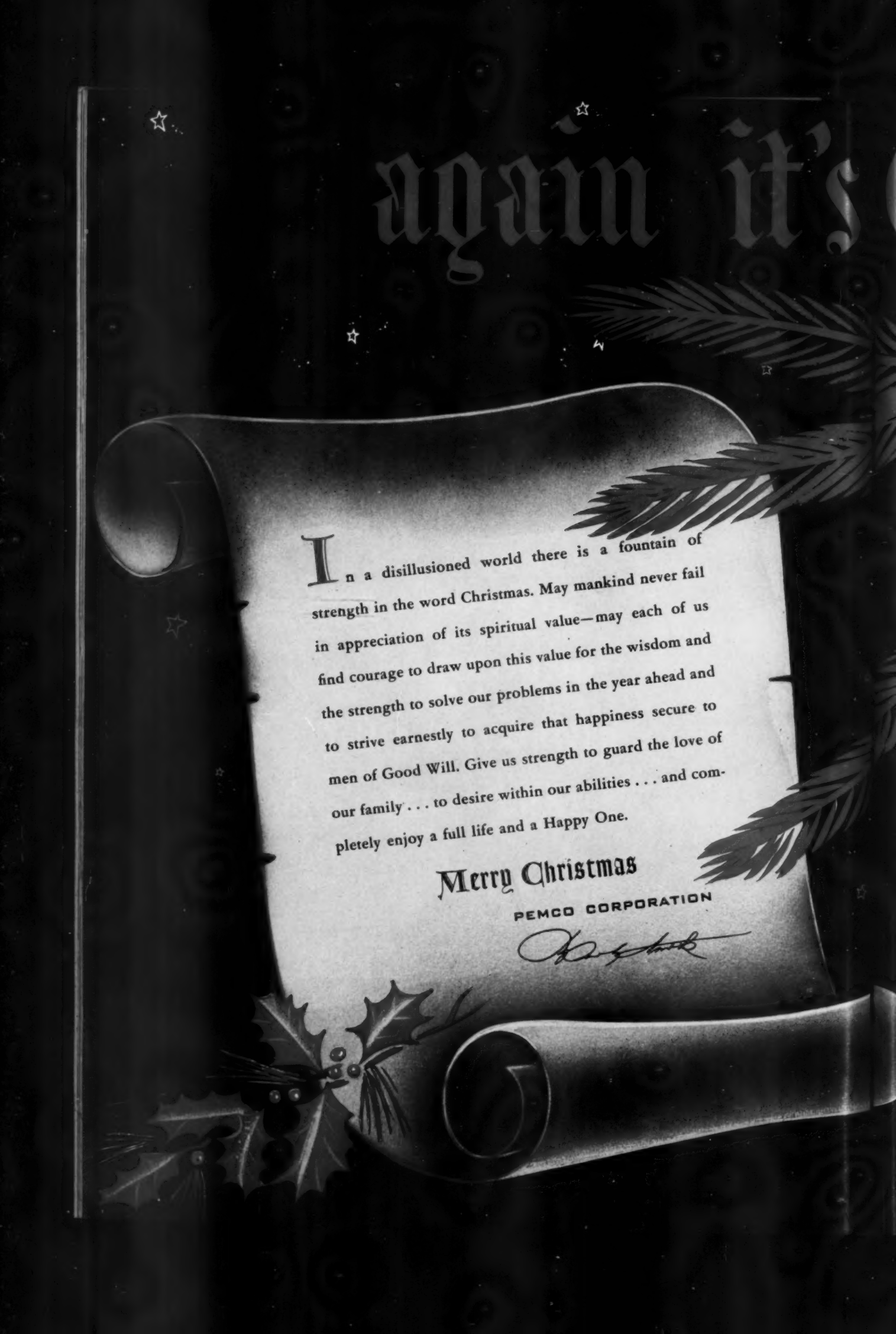
*Adapted for* finish *from a talk before the Tenth Annual Forum of the Porcelain Enamel Institute.*

**"Hellooo, J. B.? This is the Voice of Experience Speaking. . . . . DON'T!"**


again it's
In a disillusioned world there is a fountain of strength in the word Christmas. May mankind never fail in appreciation of its spiritual value—may each of us find courage to draw upon this value for the wisdom and the strength to solve our problems in the year ahead and to strive earnestly to acquire that happiness secure to men of Good Will. Give us strength to guard the love of our family . . . to desire within our abilities . . . and completely enjoy a full life and a Happy One.
Merry Christmas
PEMCO CORPORATION

Christmas

## A continuous furnace enameling plant for refrigeration products

*(Continued from Page 22)*

high, 6′ deep (I.D.). There is an exhaust canopy over pickle tanks, closed backside and using exhaust fans with face velocity of 150 FPM. Three filters are used for the nickle and neutralizer tanks; two acid resistant and one non-resistant filter. A 70 GPM water softener is a feature of the equipment. The acid, nickel and neutralizer tanks have automatic temperature control. The rinse tanks, following the cleaner tank, are built as a double tank, overflow from the second supplying water for the first rinse.

After pickling, the work enters a 40′ x 7′ x 5′ tunnel dryer, designed for a total load of 25,000 lbs./hr. This dryer has double strand continuous conveyor at the feed end and through the dryer with roller conveyor at discharge. The oven is heated with a series of line burners using low pressure inspirators and a combustion air blower. Air is at 300° F. Unload is static on the roller platform and is pushed along by the discharge of succeeding baskets, the consequent pause giving variable time adjustment for unloading procedure. The work is easily disengaged from the loading devices of the baskets and surface injury of the metal is entirely eliminated.

Procedure in mill room, pickling solutions, line inspection and porcelain enameling control are all standard practice, and need no delineation. The layout is distinguished for the amount of work occurring aloft and the original thinking evident in design of trenches and collection pit, hangers pickling baskets and swivel baffles in spray booths.

**Pickling Cycle**

| Tank | Time Min. | No. of Tanks Required | F. Temperature |
|---|---|---|---|
| Precleaner | 5 | 1 | 212° |
| Rinse | ½ | 1 | 180° |
| Cleaner | 15 | 3 | 212° |
| No. 1 rinse | ½ | 1 | 180° |
| No. 2 rinse | ½ | 1 | 180° |
| Acid | 10 | 2 | 150° |
| Rinse | ½ | 1 | cold |
| Nickel | 5 | 1 | 160° |
| Rinse | ½ | 1 | 160° |
| No. 1 neutralizer | 2 | 1 | 180° |
| No. 2 neutralizer | 2 | 1 | 180° |
| Tunnel dryer | 15 | 1 | air at 300° |

## Business in air markers

*(Continued from Page 32)*

per County, Jasper; Menard County, Menard; Marian Airpark, Wellington; Jones Field, Bonham; Dimmit County, Carrizo Springs; Gillespie County, Frederickburg; Harrison County, Marshall; Hale County, Plainview; Brazoria County, Freeport; Wilbarger County, Vernon; Tye Field, Abilene; English Field, Amarillo; Jefferson County, Beaumont; College Station, Easterwood; Val Verde County, Del Rio; Majors Field, Greenville; Culberson County, Van Horn; Love Field, Dallas; Harlingen Valley, Harlingen.

UTAH, $428,101: Municipal at Heber, Cedar City, Richfield, Salt Lake City, No. 2; and Hinckley, Ogden; Carbon County, Price; Hurricane; Junction.

VERMONT, $78,721: Municipal, Burlington; Randolph.

VIRGINIA, $560,000: Municipal at Roanoke, Danville, Norfolk; and Patrick Henry, Newport News; Richard E. Bryd, Richmond.

WASHINGTON, $1,192,400: Municipal at Westport, Tacoma, Renton; and Winslow Bainbridge, Winslow; Bowers Field, Ellensburg; Paine Field, Everett; Seattle-Tacoma and Boeing Field, Seattle; Randle; Stevenson; South Bend-Raymond; Willapa Harbor; Bellingham; Yakima.

WEST VIRGINIA, $397,025: Municipal, Fairmont; Ritchie County, Harrisville; Roane County, Spencer; Mercer County, Bluefield; Huntington Ashland, Huntington; Kanawha County, Charleston.

WISCONSIN, $558,000: Municipal at Marshfield, Wausau, LaCrosse; and Cornell Holcombe, Cable; Ozaukee County, Port Washington; Winnebago County, Oshkosh; Mitchell Field, Milwaukee; East Troy; Richland Center; Ashland; Clintonville.

Data from an announcement by CAA in July, 1948, for the 1949 fiscal year.

## Pacific Coast meeting

*(Continued from Page 43)*

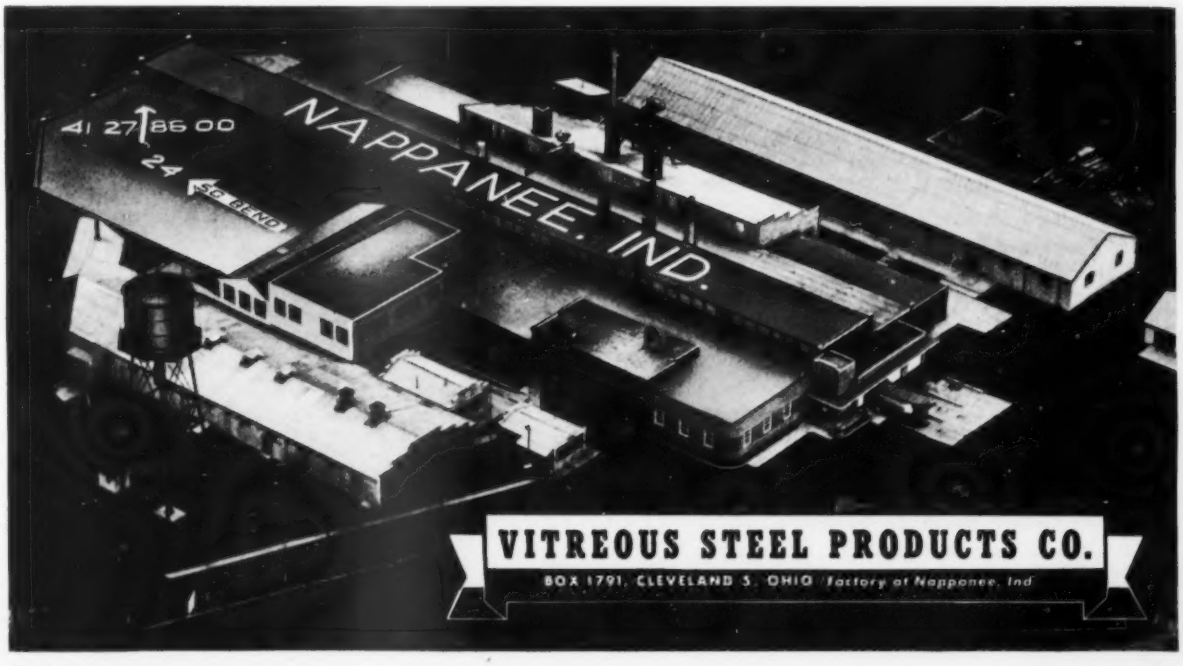
enamelers. Regardless of all of our other controls, unless the finished product gets into the hands of the ultimate consumer in good condition, the enameler is a failure. All the good work which has gone on before is lost if the finished product is damaged before the customer gets it.

Proper handling and adequate crating is as vital to success as the enameling process itself. The importance one manufacturer places on this control is illustrated by the enameler who complained about the price of frit, but admitted that the frit cost him less on his product than the crate, and he wasn't complaining about the cost of the crate. "He knew that it was important to him. As important as anything else he bought," concluded Greer.

When you fly over Nappanee and see this sign, you will know that it is on the roof of the Vitreous Steel Products Co. It marks a good shop, completely equipped, in a good town, centrally located.

It is your shop if you need high quality porcelain enameled parts. Send blue print or samples. Tell us quantities, and we will quote on a complete or enameling only basis.

FOR A BETTER ENAMELLING SERVICE



# New Supplies and Equipment

### Water demineralizer

Through the use of a "Hydrion" water demineralizer, metal finishing shops can have pure water always available with the convenience of turning on the water tap, according to the manufacturer of the new unit which consists of three principal parts: a replaceable cartridge; a wall-type cartridge holder; and an electronic indicator for quality of treated water.

Write to Department F, A. E. Tomkin & Co., 1828 Columbia Road, N. W., Washington 9, D. C.

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### "Jet blast" metal cleaning

A new "jet blast" machine for wet abrasive blast cleaning of metal surfaces is a self-contained unit, completely fitted for connection to shop compressed air lines. Typical applications of the cleaning method are: removal of rust, mill scale and heat treating scale; cleaning forging dies and metal molds; honing metal cutting tools; preparation of metals parts for enameling, painting, or plating.

Write to Armstrong Chemical & Machine Co., Painesville, Ohio.

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### Self-cleaning sludge tanks

The new self-cleaning sludge tanks are said to be suitable for cleaning sludge from spray booths, dust collectors, mill room trenches, etc. Self cleaning is accomplished by pipe conveyors having synthetic rubber flights mounted on sealed pin chains. Power required to operate the conveyors is small, 1/6 hp. for the junior size, and 1/3 hp. for the standard size sludge tanks.

Contact Hapman Conveyors, Inc., 2405 West McNichols Road, Detroit 21, Mich.

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### Overhead trolley conveyor wheel uses grease retainer bearing

A new overhead trolley wheel bearing which retains the lubricant under any operating condition is said to be suitable for conveyors operating in ovens, washing machines, degreasers and other surface preparation units. The grease retaining element consists of a double labyrinth seal and adequate lubricant cavity.

Contact Jervis B. Webb Company, Department F, 8951 Alpine Avenue, Detroit 4, Michigan.

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### "Speed clip" latch for appliances

An inexpensive latch for metal doors on cooking ranges, kitchen cabinets, furnaces, air-conditioning units and similar products may be installed without tools. The new "speed clip" is merely snapped into place with a lip in the middle to provide secure assembly.

Contact Tinnerman Products, Inc., 2038 Fulton Road, Cleveland, Ohio.

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### Acid pump for manual operation

Safe and convenient transfer of acids and other liquids from carboys, barrels or drums is possible with an improved foot or hand-actuated pneumatic pump. The liquids come in contact only with the corrosion-resistant tube and cannot affect other parts. When removed from the container, liquid drains completely.

Contact Scientific Equipment Co., Department F-12, 2700 West Huntingdon St., Philadelphia 32, Penn.

# Industrial literature

### Book on metal cleaning problems

Emphasizing the fact that every metal product cleaning problem is different, a new 28-page 2-color book takes the reader through the process of what to look for when selecting a washing machine. The skeleton, pump screening facilities, heating systems, skim box drain and overflow, inspection and clean out doors, dryers and various types of conveyors are detailed for quick comparison. A "super spray" washing action that is said to effect big savings in time and materials is explained and illustrated.

A section of the book is devoted to completely coordinated conveyorized system engineered to solve specific problems in leading industries.

For a free copy of the book, write The Alvey-Ferguson Company, Department F, Disney Street, Cincinnati 9, Ohio.

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### Bulletin on inert gas welding

Inert gas welding, an essential part of manufacture, is the subject of a bulletin just issued. The bulletin, No. 1,102, contains information for all who are using or contemplating use of helium, argon or atomic hydrogen arc welding. This includes the smallest setups for welding to the largest automatic as well as manual. Specifically, the bulletin deals with the tungsten electrodes, presented as a vital factor of inert gas welding's success.

Write to Fansteel Metallurgical Corporation, Department F-12, North Chicago, Ill.

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### Color standards comparator

A color standards comparator, showing comparative color values indicated by the designations used in seven different systems of color standards, may be obtained through W. C. Hardesty Co., Inc., Los Angeles 22, Calif.; New York, N. Y., or Dover, O.

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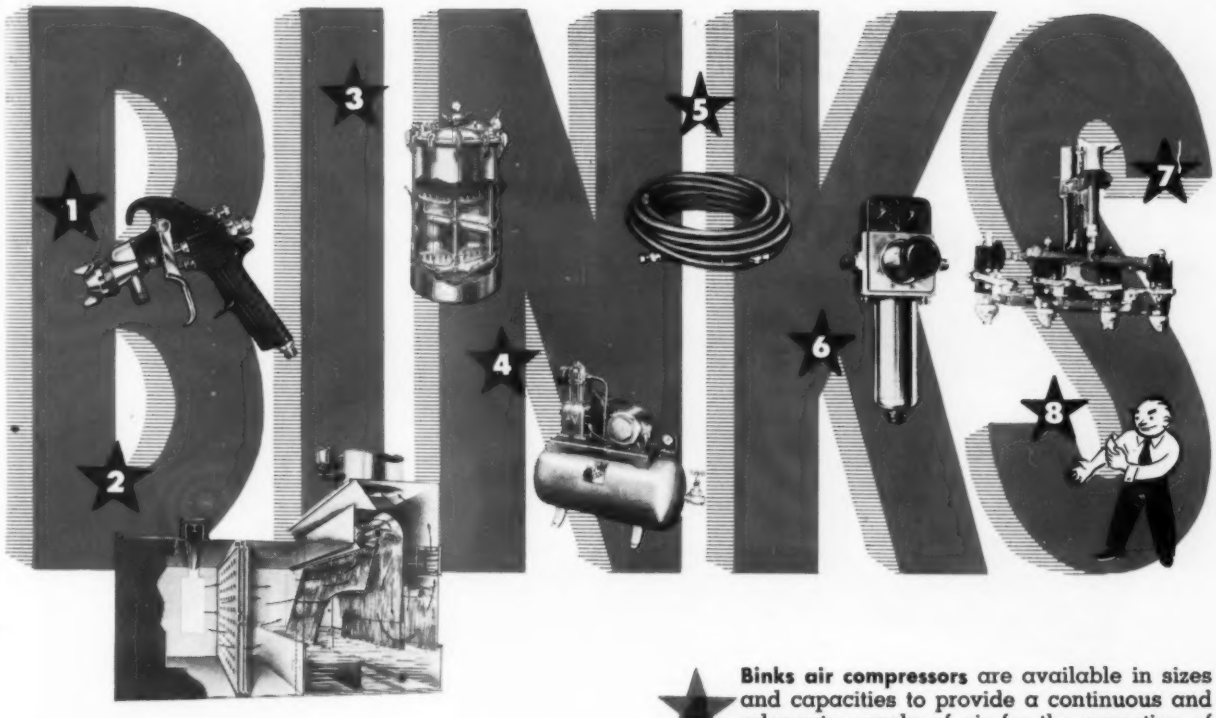
### Catalogs on spray booths, fume control, & ind. ovens

The elimination of overspray from spray booths is featured in catalog 480 which describes "centri merge" spray booths, with photographs and blueprints reproduction of typical plant installations.

Catalog 481 offers information concerning equipment for dust and fume control units, spray booths, mechanical washers, industrial ovens, and sheet metal equipment and accessories. Tables of technical information for plant managers and engineers are included.

The catalogs are available from Schmieg Industries, Inc., 364 Piquette Avenue, Detroit 2, Michigan.

# THE BIG NAME IN CERAMIC FINISHING EQUIPMENT




The specialized equipment developed by Binks for the Ceramic Industry has a *big* reputation. It's *big* in engineering detail . . . *big* in efficiency . . . *big* in economy . . . and *big* in service.

## Everything you need for finer ceramic finishing

1. **Binks Model 18V spray gun**—America's finest. Tungsten carbide inserts in the material nozzle and needle valve protect these parts from the abrasive action of the frit.

2. **Binks special ceramic Dynaprecipitor water wash spray booths,** fitted with baffle plates, reclaim the frit from the over-spray in clean re-usable condition.

3. **Binks new corrosion-proof ceramic material tanks** have copper silicon alloy shells, heads, and agitator paddles—stainless steel agitator shafts and material tubes.

4. **Binks air compressors** are available in sizes and capacities to provide a continuous and adequate supply of air for the operation of one or more spray guns.

5. **Binks air and material hose and accessories** give you longer and more satisfactory service with any type of material.

6. **Binks oil and water extractors** are your best guarantee and only insurance that perfectly clean dry air will be delivered to the spray guns.

7. **Binks famous automatic Reciprocating Spray Machine** for flat work produces superbly finished panels—*fast.* It couples speed with utmost economy.

8. **Binks engineers** always welcome the opportunity to roll up their sleeves and work out your particular ceramic finishing problems right in your shop.

"...We must think BIG and plan BIG if we are to retain our leadership. It's the only way..."

J. F. Roche
President.

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NEW YORK DETROIT LOS ANGELES ATLANTA BOSTON CLEVELAND DALLAS MILWAUKEE NASHVILLE PHILADELPHIA PITTSBURGH ST. LOUIS SAN FRANCISCO SEATTLE WINDSOR, ONTARIO, CANADA

*Write us* for your free copy of our new Catalog-Data Book. Request your copy on your company letterhead.

Cowles

FAST ACTING
EMULSION SOLVENT CLEANER

LIXOL

**LIXOL** works faster because of its multiple penetrant formulation and good rinsing properties. It produces emulsions that are stable in the face of extreme soil, temperature and water conditions—preventing soil redeposition.

**LIXOL** is designed for still tank, pre-soak and washing machine equipment. No cleaner of this type works as well in all three because:—

★ LIXOL Penetrates
★ LIXOL Rinses Easily
★ LIXOL Cleans Thoroughly
★ LIXOL Is Stable
★ LIXOL Prevents Rust

Cowles
TECHNICAL SERVICE
ON REQUEST

*Prompt shipments from local stocks.*

Cowles Chemical Company

*FORMERLY THE COWLES DETERGENT COMPANY*

METAL CLEANER DEPARTMENT • CLEVELAND 3, OHIO

# NEWS

### Record washer sales top 400,000 mark in September

Sales of standard size household washers in September cracked the 400,000 mark for the first time in history, climbing to 433,919, or 8.8 per cent higher than the previous record of 398,298 set in March, according to figures released by the American Washer and Ironers Manufacturers' Association.

The September total was 19.8 per cent greater than sales in August, and 22.5 per cent above September, 1947.

### Drakenfeld adopts group insurance

B. F. Drakenfeld & Co., Inc., manufacturers of colors and chemicals for the ceramic industry, has adopted a group insurance program for its employees, according to Scott J. Courtney, president.

### Mullins Mfg. expanding facilities

Mullins Manufacturing Corp. is spending more than a half million dollars on new buildings at its Salem and Warren (Ohio) plants. New construction includes a general office building and a factory addition to provide more space for present production facilities.

The factory addition is to the Warren plant where cabinet sinks and base cabinets for the company's Youngstown Kitchen line are manufactured. It will be 442 feet long and 160 feet wide, providing 71,000 square feet of floor area. A receiving building 93 feet by 52 feet will be constructed adjacent to the new addition, with the project scheduled for completion in May, 1949. Construction of a two-story office building at Salem is expected to be completed by February.

### Bendix appoints Sowle as manager of quality control

The promotion of Allen R. Sowle from master mechanic to manager of quality control for Bendix Home Appliances, Inc., was announced by Virgil C. Rice, director of manufacturing. Sowle's new duties include supervision of the inspection department and coordination of product planning in collaboration with engineering, purchasing, manufacturing, sales and service departments.

### Cowles Chemical offers common stock issue

Cowles Chemical Company, Cleveland, Ohio, a closely held company since its founding in 1885, recently offered to the public 6,965 shares of common stock. Underwriters reported that the entire issue was sold within forty-eight hours of the announcement.

Edwin Cowles, president, stated that this financing will provide the firm with additional working capital to make possible needed additions to productive equipment.

### "Grand Industries, Inc."

The name of the Cleveland Co-Operative Stove Company was recently changed to Grand Industries, Inc., according to a company announcement.

There will be no change in the method of operation of the divisions of the company which will continue to operate under the following trade names: Cleveland Foundry Co., Cleveland Distributing Co., and Grand Home Appliance Co. The vitreous enameling division will be operated under the name Grand Enameling Company, it was stated.

### Gossett heads Plumbing & Heating Industries Bureau

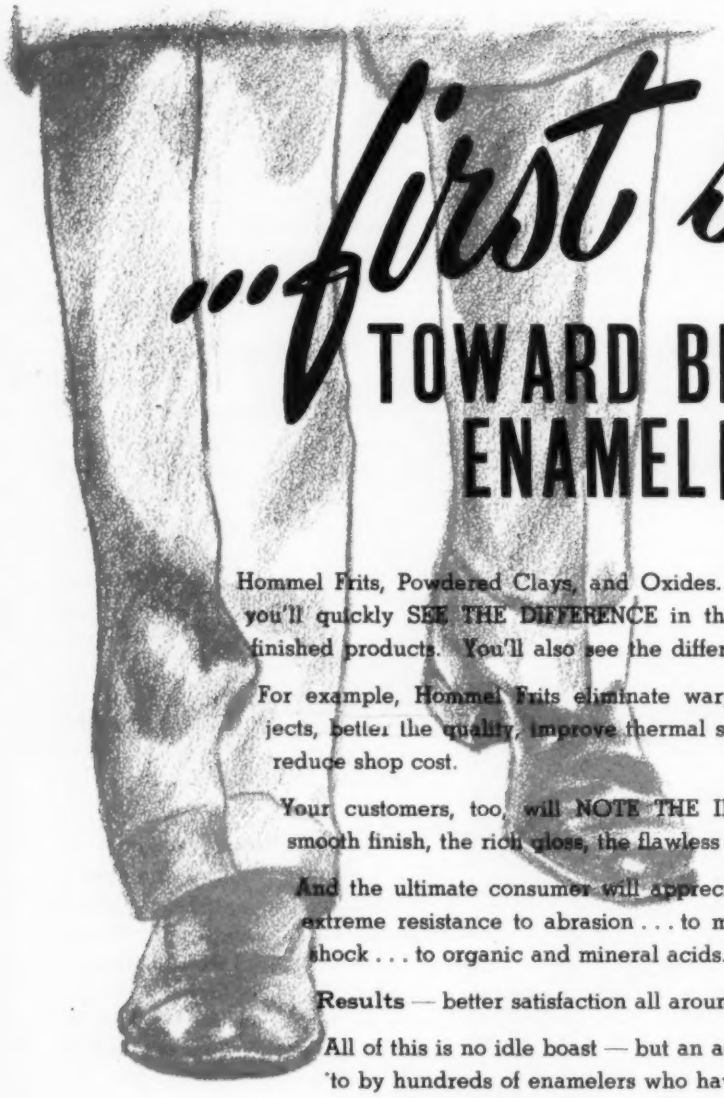
E. J. Gossett, president of Bell & Gossett Co., Morton Grove., Ill., was elected president of the Plumbing and Heating Industries Bureau at its 29th annual meeting in Chicago, Oct. 21.

W. W. Weaver, past president of the Bureau, stated in a report that "Publicity helps to increase the market potential and build a backlog for sales."

### NESA sign design contest ends December 31

The third annual sign design contest closes December 31, according to an announcement by the National Electric Sign Association. Following the pattern of last year's contest, an actual store building was selected as the problem for which contest entries are to be designed. Whereas a corner drug store was used last year, the contest committee selected a middle-of-the-block hardware store for the new contest.

Awards will be based on the best functional solution to the problems of



# ...first step TOWARD BETTER ENAMELING

Hommel Frits, Powdered Clays, and Oxides. By using them, you'll quickly SEE THE DIFFERENCE in the quality of your finished products. You'll also see the difference in your cost.

For example, Hommel Frits eliminate warpage, minimize rejects, better the quality, improve thermal shock resistance and reduce shop cost.

Your customers, too, will NOTE THE IMPROVEMENT — the smooth finish, the rich gloss, the flawless surface.

And the ultimate consumer will appreciate the durability, the extreme resistance to abrasion . . . to mechanical and thermal shock . . . to organic and mineral acids.

**Results** — better satisfaction all around.

All of this is no idle boast — but an accomplished fact, attested to by hundreds of enamelers who have taken this forward step.

Call Hommel Service Engineers for practical suggestions. No matter how minor nor how big your problem, write, wire, or phone. Today!

**Laboratory Controlled Production of Ceramic Supplies**

- FRIT for Steel, Cast Iron or Pottery
- CERAMIC COLORS
- CHEMICALS
- BRONZE POWDERS
- METAL POWDERS
- SUPPLIES
- EQUIPMENT

Our Technical Staff and Samples are available to you without obligation. Let us help you with your problems.

THE O. HOMMEL CO.
PITTSBURGH 30, PA.
Pacific Coast Agents
L. H. BUTCHER CO.

*World's Most Complete Ceramic Supplier*

(1) advertising value, architectural suitability and identification of the store, (2) contribution to the development of sign design, and (3) practicability of construction, it was stated.

All entries in the contest should be sent to National Electric Sign Association, 224 S. Michigan Ave., Chicago 4, Illinois.

## Harold Jackson Award for export packaging

Paul H. Paulsen, Sr., engineer of Wm. H. McGee & Co., Inc., Marine Underwriters, is shown making the presentation speech for the Harold Jackson Award for export packaging which was given to Carl A. Johnson, of Schlumberger Well Surveying Corp., Houston, Texas.

The award was presented in the Export Packaging Contest of the Industrial Packaging and Materials Handling Exposition held this year in Chicago. To the right of the trophy is A. L. Green, special representative of the Association of American Railroads, who was chairman of the contest committee.

Readers of *finish* are invited to participate in the next annual award which will be presented for outstanding contribution for the betterment of export packaging. The next contest will be held in Detroit early in October, 1949. Later announcement will be made concerning registration for this event.

### Ross Engineering opens new Pacific Coast office

J. O. Ross Engineering Corp. has moved into new and larger offices located in the new Westinghouse Building, 600 St. Paul Avenue, Los Angeles 14, Calif., it was announced recently. R. W. Morsch will continue in charge of the Los Angeles office.

## Report on porcelain enameling industry coordinating committee

THE Coordinating Committee for the porcelain enameling industry met in the Student Union Building at the University of Illinois during the Porcelain Enamel Institute Forum. All the clubs were represented except the Pacific Coast Club.

Among those present at the meeting were: Dr. G. H. Spencer-Strong, of Eastern Enamelers Club; Paul Cecil and Albert R. Mallonn, Central Enamelers Club; G. W. Hofstetter and George Tuttle, Chicago Enamelers Club; Charles Pearce, American Ceramic Society; Edward Mackasek,

*Attending the coordinating committee meeting were, l. to r., Paul Cecil, Central; Dr. G. H. Spencer-Strong, Eastern; W. J. Plankenhorn, chairman; Dana Chase, secretary; George Tuttle & G. F. Hofstetter, both of Chicago; Charles Pearce, ACS; Edward Mackasek, PEI; and Albert R. Mallonn, Central.*

Porcelain Enamel Institute; W. J. Plankenhorn, Coordinating Committee chairman; Dana Chase, Coordinating Committee secretary.

Problems placed before the Committee were considered. The first discussion concerned the plans of the clubs for the rotation of officers in order to take advantage of talent available within the clubs, but at the same time take advantage of past experiences in the operation of the clubs.

### Meeting dates – attendance

Further discussion concerned the importance of dates as related to attendance. It was recommended that each representative convey to his club the desirability of distribution to other clubs and allied organizations dates for the complete series of meetings for a year just as soon as they are tentatively established. This would afford an opportunity for the Porcelain Enamel Institute, American Ceramic Society Enamel Division and the District Enamelers Clubs to make changes in meeting dates where it is desirable to avoid conflicts.

The group was in favor of obtaining all possible advance publicity on meeting dates and programs through the regular publication channels in addition to mailed announcements, and to the distribution of meeting reports to the press of the industry. A suggestion was made that each club appoint a publicity chairman to furnish publicity releases to magazines and to the other Enamelers Clubs.

### Future committee membership

It was suggested that in the future the membership of the Coordinating Committee should be considered to consist of all officers of the Enamelers Clubs, plus the program chairman if he is not an officer; the managing director of the PEI; the general secretary of the ACS; and the coordinating committee chairman and secretary. The suggestion was for the purpose of assuring representative attendance at the semi-annual meetings which are held during the ACS Convention and the PEI Forum, and also so that there never will be at any time a complete change in representative personnel from any of the clubs from one meeting to another.

The next regular meeting of the Coordinating Committee will be held during the next ACS Convention in Cincinnati, Ohio.

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### IBRM begins field training program

An extensive field training program to stimulate the sale of hot water and steam heating systems was authorized at the annual meeting of The Institute of Boiler and Radiator Manufacturers, held at Rye, New York, October 26 to 28.

More than 100 members and associate members from the United States and Canada attended the three-day meeting at which reports were presented on research, testing and rating of boilers, short courses, consumer advertising, publicity, and other activities pertaining to the interests of manufacturers of boilers, radiators, baseboard heating units, convectors, controls, and hot water and steam heating equipment and accessories.

Continued active demand for hot water and steam heating equipment is expected in 1949 and well into 1950, according to leading manufacturers who participated in an open forum discussion on current conditions in the industry.

## General Porcelain dries signs with infra-red

The accompanying photograph shows the method employed in the plant of General Porcelain Enameling & Mfg. Co., Chicago, for drying large 72″ diameter signs.

A vertical dryer employing infra red lamps is installed in tandem with the conveyorized spray booth. Sprayed porcelain enamel has one minute air dry between spray booth and drying oven. Product temperature reaches 125° to 150° F.

This small infra red oven has two opposing vertical banks 8 lamps high with top and bottom rows angled 22½°.

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### AMA 18th annual packaging exposition in Atlantic City, May 10-13

The American Management Association has announced that its 18th annual National Packaging Exposition, largest in the history of the event, will be held May 10-13, 1949, in the Public Auditorium in Atlantic City, N. J.

More than a thousand packaging executives, engineers and technical experts will discuss the management aspects of materials, methods, procedures and merchandising, it was stated.

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R. A. Emmett, president of Detrex Corporation, has announced the ap-

pointment of Garrett C. Van de Riet as controller. Van de Riet has been with the firm for the past six years on special assignment in the industrial equipment, dry cleaning, oil extraction, and solvent divisions of the company.

## Prominent men of AGA

finishfoto

The *finish* camera caught two prominent American Gas Association men in the AGA Laboratory display at the recent Association convention in Atlantic City. They are H. Carl Wolf, managing director of AGA, and R. W. Hendee, Association president.

## Porcelain Enamel Institute Development Committee reports 28 new members during 1948

In its report to the annual meeting of the Porcelain Enamel Institute, the Institute Development Committee, with J. M. Tuthill as chairman and Dana Chase as co-chairman, reported the addition of 28 new companies to the membership roster during 1948.

**A 3-part plan** of approach was outlined in the committee report: first, a comprehensive trade publication advertising program to present the advantages of Institute membership to all potential members throughout the industry; second, a personal letter follow-up by committee members and the PEI Washington office; third, personal solicitation by committee members.

**Advertising** through trade publications and letter follow-up has played an important part in this year's program, according to the committee report, which states:

"In the first place, it has paved the way for personal solicitation. Secondly, and of equal importance, it has spread the gospel to the scores of potential members who could not possibly be contacted personally during a campaign of a few months. Direct inquiries to the Institute office, and to the Development Committee, have proved the effectiveness of this effort. As a matter of fact, we have actually obtained a few members (including foreign memberships) who have not been contacted personally by the Committee, and who have indicated in writing that their initial interest resulted from our advertising campaign."

In presenting the committee report before the annual meeting, Dana Chase, co-chairman, said:

"Although the Institute Development Committee feels that progress well worth the effort expended has been made, it is our strong conviction that the Institute has made no more than a worthwhile start in its plan for making the PEI a truly representative association for the porcelain enameling industry as a whole. We have been fortunate in counting among our new members some of the leading producers of major appliances and home equipment items, whose porcelain enameling facilities are classed as "captive" plants due to the fact that they form only a part of a much larger manufacturing operation. The benefits of PEI membership which will accrue to these new members can logically be spread to scores of other companies in the same category, if the Institute Development Program is carried out on a continuous basis, and with increasing momentum.

"Your committee would like to repeat that while some progress has been made, it is felt that the program is just starting. One thing we do feel has been accomplished during 1948. We believe it has been definitely proved that a 3-part program, such as just outlined, can and will, over a period of time, accomplish the purpose desired — that of developing a greatly expanded membership and one that truly represents a cross section of all phases of industry activity."

**Plans for 1949,** it was strongly urged by the committee, should provide for continuation of the 3-part program used this year. In addition, it was suggested that an extension to this plan be developed and effectively promoted by the 1949 committee. This extension would be an "every member canvass," the details of which would be completed and carried out by the new committee.

### Diamond Alkali names Schweng as director of market research

Appointment of Otto L. Schweng to the newly created post of director of market research for Diamond Alkali Company was announced by Raymond F. Evans, company president.

Headquarters for Diamond's new market research activities will be centered in the company's New York sales division at 570 Lexington Ave.

### Armco appoints director of purchases

W. W. Sebald, president of Armco Steel Corp., announced that Joe S. Thomas has been advanced to the

# DESPATCH-*Engineered*

## *for* GUARANTEED PERFORMANCE

From the largest FINISHING SYSTEMS

- OVENS
- DRYERS
- RUST-PROOFERS
- SPRAY BOOTHS
- AIR CONDITIONERS
- CONVEYORS

and allied equipment. Installed as complete system or in separate units.

To the smallest individual OVENS

DESPATCH batch type Finish Baking Oven, elec. or gas. Engineered to same standards as other Despatch units illustrated above.

FOR 45 YEARS, as specialists in providing ultra-modern finishing equipment, DESPATCH has maintained a fixed policy of *engineering every installation, regardless of its size, to identical high standards.*

This means that the smallest DESPATCH baking oven is planned, sized and selected for your job by the *same* experienced engineering specialists who plan, design and install huge DESPATCH Finishing Systems. And your order is handled with the same painstaking care and attention to detail.

Thus you profit, even on the smallest individual unit, from years of accumulated experience and practical "know-how."

*You will want the new Despatch brochure* with specifications, photographs, layouts.

**Write today for Bulletin 51. See Despatch Bulletin in 1949 Sweet's File for Mechanical Industries.**

**DESPATCH OVEN COMPANY**

*Minneapolis Office:* 619 S. E. 8th Street
*Chicago Office:* 221 N. LaSalle Street

**WIRE or PHONE for Prompt Service to Your Finishing Department**

**DESPATCH OVEN COMPANY** MINNEAPOLIS 14 CHICAGO 1

position of director of purchases to fill the vacancy caused by the death of Newman Ebersole. Thomas has been with Armco since 1927, when he was graduated from Cornell.

### PEI committee agrees on standard sign colors

finishfoto

W. F. Wenning, Ceramic Color & Chemical Mfg. Co., chairman of the Color Standardization Committee (signs) of the Porcelain Enamel Institute, displays porcelain enameled sample plates representing the standard colors of the Outdoor Advertising Association.

Other members of the Committee include Jake E. Eagle, Pemco Corp.; R. F. Duncan, Ferro Enamel Corp.; H. H. Draker, Harshaw Chemical Co.; Harold Brenner, B. F. Drakenfeld & Co., Inc.; R. L. Fellows, Chicago Vitreous Enamel Product Co.; J. W. Vicary, Ervite & Co.; Earl McDonald, Ingram-Richardson Mfg. Co.; and Ernest Hommel, The O. Hommel Co.

### AGA appoints head of home service committee

Eleanor Morrison, director of home service for Western District of the Michigan Consolidated Gas Company, has been appointed chairman of the Home Service Committee of the American Gas Association for 1948-49 by W. M. Jacobs, chairman, AGA Residential Gas Section.

### Wyandotte Chemicals acquires more manufacturing facilities

E. M. Ford, president of Wyandotte Chemicals Corporation, has announced the acquisition of the manufacturing facilities and clay deposits of Blue Mountain Clay Co., Inc., producers of all-purpose oil and water floor absorbent.

## Central District enamelers visit Frigidaire

THE November 12th meeting of the Central District Enamelers Club was held in Dayton, Ohio, home of Frigidaire Division of General Motors Corporation.

A large group, including key plant men from Ohio, Illinois, Michigan and Pennsylvania, met at Plant No. 2, Moraine City, as dinner guests of

*This photograph shows the group of enamelers who toured the Frigidaire plant.*

Frit BUYERS Too...

Can Use.. LITHIUM TITANATE
LITHIUM ZIRCONATE

## for Titania Cover Coats

***BECAUSE these powerful fluxes are suitable for mill additions***

This fact opens up their use to the entire enameling industry. Lithium Titanate and Lithium Zirconate are both in use as mill additions to lower the firing temperature and increase reflectance of titania enamels.

Users report that lithium-bearing titania enamels will reach optimum opacity at greatly reduced temperatures and at increased chain speeds. Only ½-1% Lithium Titanate or Lithium Zirconate is sufficient to permit firing at temperatures and times safely below those at which titania tends to change color.

Here's what you get... Improved reflectance through lower firing temperatures with

**Attendant Fuel Savings**
**Increased Acid Resistance**

through mill addition of Lithium Titanate or Lithium Zirconate.

Lithium Titanate and Lithium Zirconate are available immediately in commercial or experimental quantities.

***We can supply basic information***
***Just fill in the handy coupon below.***

**METALLOY CORPORATION** RAND TOWER
Minneapolis 2, Minnesota

Gentlemen:

Please send me full information on the use of Lithium compounds for

☐ Cover coats ☐ Ground coats

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*Specialists in Lithium and Lithium Compounds*

## DO YOU NEED A GOOD ENAMELING SERVICE

**You can get prompt and dependable porcelain enameling service at Mid-West**

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**Conveniently located for all midwestern manufacturers**

★ ★

**Cast Iron or Steel Enameling**
**Stencil Work**
**Screen Process Decoration**

★ ★

**We will quote from samples or call to discuss your finishing problems at your convenience**

**Phone or Write**

**MID-WEST PORCELAIN ENAMEL CO., INC.**
1602 South Main St. Rockford, Illinois
Telephone: 4-7112


### Apex completes large addition to main plant

The Apex Electrical Manufacturing Company has completed and equipped a 50,000 square foot addition to its main plant in Cleveland, and has started production on its new automatic clothes washer, according to C. G. Frantz, president.

The new product, known as the Apex Wash-A-Matic, utilizes a geyser action principle rather than the agitator.

Frigidaire, for a brief meeting in the company's auditorium, and a trip through the fabricating and enameling divisions of the mile-long plant where Frigidaire refrigerators, electric ranges and all-porcelain automatic washers are made.

Featured speaker at the meeting was Frank C. Lyons, head of public relations, Frigidaire. Mr. Lyons traced the history of the electric refrigerator from the early days of the "electrified" ice box (1913) to the time when this one producer saw its 10,000,000th refrigerator (October, 1948) roll off the production line.

The plant trip was a treat for all plant men. With production in full swing in all departments, there was ample opportunity for everyone to observe all fabricating and enameling operations, and compare notes.

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The Frigidaire trip follows by just 7 months a similar trip through the Westinghouse, Mansfield, Ohio, plant by the Central District Enamelers. Much credit is due the policy makers at both companies.

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**ATTENTION!**

**Furniture Market Dates**

The home furnishings industry is reported to have won its major objective in the well publicized controversy over Market dates. Provisions of the new working agreement with Chicago hotels call for a change to new Market dates for the years 1950 and 1951. *For the year 1949, however, it was necessary to revert back to the previously established dates which, for the January 1949 Market, are from January 3 to 15.*

Before dates could be finally established and confirmed, it became apparent that as great as is the capacity of hotels in the Greater Chicago area, they could not accommodate the number of buyers and sellers who wished to come to the January Market. This was due to prior commitments and lack of time to change them. The Merchandise Mart and the American Furniture Mart, joined by a group known as the Joint Market Dates Committee, tried to set the

*to Page 68* →


# *Oven Conveyors*

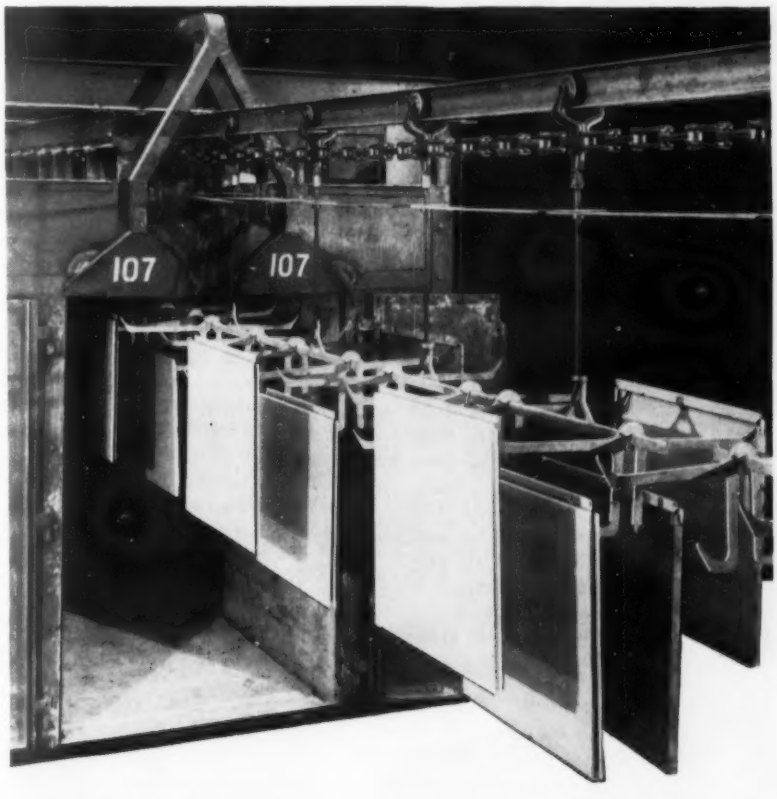
**. . . that withstand operating temperatures *and* "heat" on production!**

**High capacity forged steel chain (ultimate strength 48,000 lbs.) . . . ball bearing Red Seal Trolleys especially designed to retain lubricant . . . Jervis B. Webb Furnace and Oven Conveyors stand up under "heat" on production.**

**Heat seal plates and correct design provide resistance to processing temperature and long life.**

**More than 25 years conveyor experience . . . we know how to meet your needs . . . lower your costs.**

**Tell us what you want in conveyors.**




***Jervis B. Webb Conveyors*** **are widely used in enameling plants—we have the equipment and the experience to design them for satisfactory operation . . . long life . . . low maintenance.** ***Write for Data on our conveyors.***

*QUALITY • SERVICE • DEPENDABILITY*

**JERVIS B. WEBB COMPANY**

*Conveyor Engineers and Manufacturers*

8951 ALPINE AVENUE • DETROIT 4, MICHIGAN

*Offices in Principal Cities*

→ *from Page 67*

opening date of the Chicago Winter (January) Market one week later than it had been heretofore, to open it on the Monday nearest January 10th. Hotels had commitments which left less than 2,000 rooms for the period requested. Since it takes 10,000 rooms to house present-day Markets, this presented an impossible situation, according to Market authorities. As a result of negotiations, hotels belonging to the Greater Chicago Hotel Association will guarantee 7,500 rooms for the January 3 to 15 dates. The balance of rooms needed will be found again in hotels of the outlying Chicago and suburban areas.

It is announced that *all hotel reservations made prior to the date of October 15, 1948, must be re-confirmed.* If you have applied and received a letter from one or more hotels saying that accommodations are unavailable, it is suggested you write them again giving as exact information as possible about the time of arrival and length of stay, and confirmation may now be possible.

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Philco Corporation reports refrigerator production up 27% over 1947.

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### Behnke advanced by Hotpoint

A. H. Behnke has been elected vice president in charge of materials, by the board of directors, Hotpoint, Inc., James J. Nance, president, has announced.

The department was created during the past year and Behnke is the first company officer to head it, the announcement said.

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### Steel production record

Steel production in Chicago district mills of Carnegie-Illinois Steel corporation reached new heights last month with the production of 859,650 net tons. The previous high was 812,459 net tons in May, 1947.

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### University of Illinois news

One hundred and forty-five students are enrolled in the Department of Ceramic Engineering at the University of Illinois during the current term. Forty-three of these are graduate students including: seven who are on industrial and Graduate College Fellowships, eight who have chosen Ceramic Engineering as their minors, and several who are employed full time in the department but carry one or more units of graduate subjects.

James H. Healy holds the Orton


**Filter All Plating Solutions Faster, More Completely in**

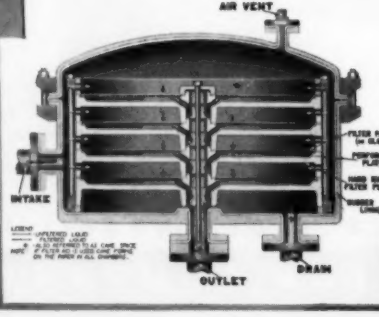
**SPARKLER**
***Horizontal Plate***
**FILTERS**

Because the filter cake is held horizontally, it is absolutely stable to the end of each filtering cycle. And cycles are longer because the cake retains its porosity longer. That is why the "horizontal principle," as embodied in Sparkler filters, gives you more efficient, low cost, operation. Sparkler filters are pressure-tight and leak-proof, designed for intermittent or continuous operation.

**4 Plating Solution Types**

1. Rubber-lined for bright nickel
2. Stainless steel for acids
3. All Iron for alkaline solutions
4. All Steel (with Stainless Pump) for chromium

**SPARKLER MANUFACTURING CO.**
Mundelein, Illinois




Made in Capacities
60 to 10,000 G.P.H.
*See your supplier or Write for details*
Our Engineering Service is available for any specialized problems.

Foundation Fellowship. Formerly employed as ceramic engineer for Wrought Iron Range Company, his current research work is on enamel smelter refractories.

Harold G. Sowman holds a fellowship from the Titanium Alloy Mfg. Company. His current research work is on a phase equilibrium study of the $ZrO_2$-$TiO_2$-$SiO_2$ system.

The U. of I. student branch of the American Ceramic Society reports the largest membership in its history, with 102 active members.

### Faulkner new Bendix P.A.

The appointment of Jack A. Faulkner as purchasing agent was recently announced by Bendix Home Appliances, Inc. Faulkner joined Bendix in 1944. For the past 18 months he has been a buyer.

### Fitzpatrick to Kaiser Fleetwing

William Fitzpatrick, formerly with Pressed Steel Car Company (Appliance Division) in Chicago and prior to that with Newark Stove Company in Newark, Ohio, is now with Kaiser Fleetwing, in Bristol, Pa.

### Lustron appointments

With the start of volume production of the porcelain enamel, all-steel Lustron Home in sight, Carl G. Strandlund, president of Lustron Corporation in Columbus, O., announced the appointment of seven key employees.

The men, all of whom have assumed their new duties, and their titles are:

Elmer D. (Ike) Walker, manager of production planning.

Lyman C. Athy, production superintendent of the ceramic division.

Glenn J. Holzberger, assistant production superintendent of the ceramic division.

M. E. Lankford, chief of the control laboratory.

G. W. Lindberg, chief of the chemical control laboratory.

J. R. Karpowicz, general foreman of inspection of the ceramic division.

R. G. Sherman, assistant general foreman of inspection of the ceramic division.

Mr. Walker was plant manager of the Roberts & Mander Corporation in Hatboro, Pa., for four years. Before joining Lustron earlier this year, he had his own consulting business for four months.

**More industry news - Page 70 →**

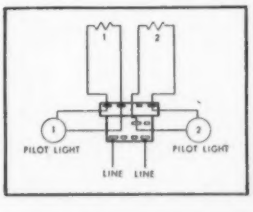
# Robertshaw ONE DIAL
## AUTOMATIC OVEN TEMPERATURE REGULATION

The Robertshaw Model C-1 shown here is a combination thermostat and selector switch. It automatically switches from "Preheat" to "Bake".

For fast preheating of oven, dial is turned to "Broil" position first, then to the temperature setting desired. This turns ON both the lower baking and upper broiling elements. Both the "Bake" and "Broil" pilots turn ON. When oven reaches set temperature both pilots turn OFF, signalling that oven is at pre-heat temperature and ready for food to be baked or roasted. The broiling element will automatically remain out of the circuit and the set oven temperature will be maintained by cycling of lower element only. For low temperature and slow pre-heat, dial is turned from OFF to desired temperature, thus throwing on the lower element only.

Write for full information about this and other Robertshaw Thermostats for home appliances.

**Wiring Diagram No. R-2385-C—SLOW HEAT.** *A Element #1*—Turn dial to any temperature. Element #1 cycles at set temperature. *B Element #2*—Turn dial to maximum temperature. Element #2 cycles at maximum temperature. **FAST HEAT.** Turn dial to maximum temperature then back to desired temperature. When set temperature is reached, elements #1 and #2 are automatically disconnected and after that only element #1 is cycling at set temperature.



In home and industry *EVERYTHING'S UNDER CONTROL*

Robertshaw-Fulton
CONTROLS COMPANY
ROBERTSHAW THERMOSTAT DIVISION
YOUNGWOOD, PENNSYLVANIA

## Improved packaging for neon signs

*(Continued from Page 27)*

standards for crates to be used for neon signs. For example, the wood must be of specified sizes and seasoned and free of bad cross grains or knots. Spaces between boards over tubing may not be over 3″ and in no case over 6″, sides being diagonally braced. Signs must be securely blocked within the crate, a clearance of 3″ being maintained between glass tubing and sides of crate, and a cushion placed between sign and bucks at all points of contact of the two. Another specification is the use of cement coated nails of specified sizes.

Crating of outdoor neon signs with porcelain enameled faces imposes no particular problem. A well designed sign is built around a welded steel frame. The crate is so designed that at all contact points the weight of the sign (and crate) is distributed over this steel frame work.

It is a little too early to draw comparative statistics, but it is the consensus of sign men that in the short time this uniform packaging policy has been in force that results have been gratifying.

Any slight additional costs involved by reason of conformance with standard packaging policies certainly should be offset by not only continuation of the one and one-half times first class rate rather than four times, but also in a smaller number of damage claims and increased customer satisfaction.

Guaranteed Pickle Room Results
with
Specification Materials
and
Experienced Service

◆

Suppliers to Porcelain Enameling Plants Exclusively
CLEANERS • NEUTRALIZERS
DRAWING COMPOUNDS

◆

MANUFACTURERS OF LEPCO PRODUCTS

V. B. PUNDERSON COMPANY
402 SWETLAND BUILDING CLEVELAND 15, OHIO

### Meetings N.Y. Metropolitan A.C.S.

Next meeting of the New York Section will be held on January 19, 1949, at the Grill Room of the Tramer Restaurant, 1 West 52nd. Street. (6:30 PM.) Two later meetings will be held at the same time and place on March 16 and May 18 respectively.

### House a day at Lustron

As of November 5 Lustron Corporation was producing a house a day at its new plant in Columbus, Ohio.

It is expected that production will increase rapidly now that the initial start has been made.

Interest in the Lustron Home is now reported to be worldwide.

### Canadian Ceramic Society convention, February 7-9

The 47th annual convention of the Canadian Ceramic Society will be held at the Royal Connaught Hotel, Hamilton, Ontario, February 7, 8 and 9, it has been announced.

Joseph F. Collins, safety supervisor for the eastern district of The Youngstown Sheet and Tube Company, is the new chairman of the metals section of the National Safety Council.

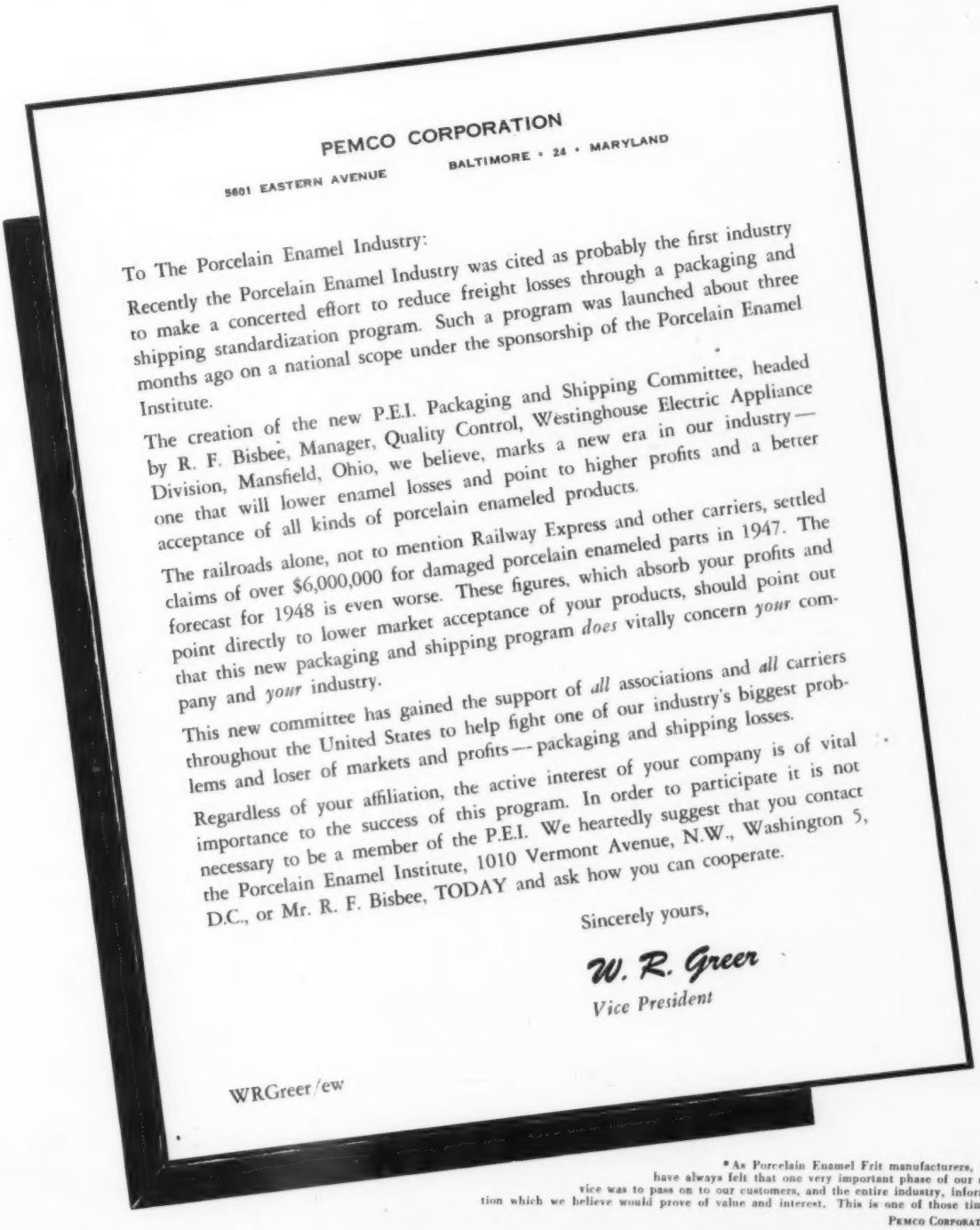
### Spence to Lustron

Lustron Corporation has announced the appointment of C. F. Spence as foreman of the ceramic control department.

*to Page 72 →*

# AN *Open Letter**

## TO THE PORCELAIN ENAMEL INDUSTRY...



PEMCO CORPORATION

5601 EASTERN AVENUE BALTIMORE • 24 • MARYLAND

To The Porcelain Enamel Industry:

Recently the Porcelain Enamel Industry was cited as probably the first industry to make a concerted effort to reduce freight losses through a packaging and shipping standardization program. Such a program was launched about three months ago on a national scope under the sponsorship of the Porcelain Enamel Institute.

The creation of the new P.E.I. Packaging and Shipping Committee, headed by R. F. Bisbee, Manager, Quality Control, Westinghouse Electric Appliance Division, Mansfield, Ohio, we believe, marks a new era in our industry— one that will lower enamel losses and point to higher profits and a better acceptance of all kinds of porcelain enameled products.

The railroads alone, not to mention Railway Express and other carriers, settled claims of over $6,000,000 for damaged porcelain enameled parts in 1947. The forecast for 1948 is even worse. These figures, which absorb your profits and point directly to lower market acceptance of your products, should point out that this new packaging and shipping program *does* vitally concern *your* company and *your* industry.

This new committee has gained the support of *all* associations and *all* carriers throughout the United States to help fight one of our industry's biggest problems and loser of markets and profits—packaging and shipping losses.

Regardless of your affiliation, the active interest of your company is of vital importance to the success of this program. In order to participate it is not necessary to be a member of the P.E.I. We heartedly suggest that you contact the Porcelain Enamel Institute, 1010 Vermont Avenue, N.W., Washington 5, D.C., or Mr. R. F. Bisbee, TODAY and ask how you can cooperate.

Sincerely yours,

*W. R. Greer*

*Vice President*

WRGreer/ew

*As Porcelain Enamel Frit manufacturers, we have always felt that one very important phase of our service was to pass on to our customers, and the entire industry, information which we believe would prove of value and interest. This is one of those times.

PEMCO CORPORATION

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finish

(CERAMIC FINISHES ON METAL)

*Established to help an Industry Grow through Cooperative Effort*

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### RATES

| Display classified | 1 ti. | 6 ti. | 12 ti. |
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| 1" to 2" inclusive, per inch | 9.00 | 8.00 | 7.00 |
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Measured in vertical column inches, columns 2⅛ inches wide. Accepted in column inch multiples only. Add 25% for reverse plates.


### FOR SALE

Two sets double speed forks, two 100 lb. and two 500 lb. pebble mills. Also one 6 ft. long x 3 ft. wide x 3 ft. deep wood tank, monel rods.

**PORCELAIN SALES CO.**
**P.O. Box 320**
**BELLEVILLE, ILLINOIS**


→ *from Page 70*

Spence was associated with Westinghouse Electric Corporation at its Mansfield Works for 12 years in various capacities, at one time being foreman of its mill room and process control. He also formerly worked for Perfection Stove Co., of Cleveland.

### ICHAM annual meeting in Cincinnati, Dec. 6-8

The Institute of Cooking and Heating Appliance Manufacturers' 16th Annual Convention and Exhibit will be held at Netherland Plaza Hotel, Cincinnati, December 6, 7 and 8.